GENERAL INDEX.

(Illustrated Subjects are Marked with an Asterisk after the Number of the Page.)

A

ABELL, Sir W. S., on Safety of Life at Sea (1929) Conference, 489*. See 485
Aberdeen and Commonwealth Line, Reconditioning of S.S. "Hobson's Bay," 541
Accelerometer for Motor-Lorry Wheel Impact Research, 71

Accidents :

Boiler Explosion Inquiries, Board of Trade Reports, 453, 493
— — Tranmere Bay, Report, 577
Coal-Gas Poisoning, Report, 261
Dam, Eildon, Victoria, Australia, Failure of, 134
Explosions of Welded Pressure Vessels, 362
Fires in Steamship Bunker and Cargo Coal, Report, 463
Industrial Accidents to Apprentices, Investigation on, 24
Mine Accidents, Effects of Temperature and Humidity, 295
— and Works Accidents, and Ventilation Problems, 536
National Safety Week, 513
Petroleum Industry, California, Fatalities in, 324
Road and Rail Accidents in Germany, 709
Accumulators, Steam, Ruths, in the Power Industry, 155; Charlottenburg Power Station, 764*
Acetylene Welding. See *Welding*
Acid Separator and Saturator, Becker Coke-Oven Plant, Sheffield 699*
Acoustics, Ridge Formation in Sounding Tubes, 676
"Active," H.M. Destroyer, 347
Adams, G., Work of, 772
Adams, R. R., on Model and Full-Size Tests of Single-Screw Merchant Vessel, 263
Address, Presidential. See *Presidential Address*
Adelaide Harbour, Pile-Driving Plant (British Steel Piling Co., Ltd.), 57*
Admiralty, Director of Naval Construction, History of Office, 33
— and Early Steam Vessels, 498
— See also *Warships*
Aerial Navigation. See *Aeronautics*
— Propeller. See *Propellers* under *Aeronautics*
— Ropeway. See *Wire Ropeway*
— Transport. See *Aeronautics*
Aerodynamics. See *Aeronautics*
Aeronautical Society, Royal, Progress of Gliding in Germany, by Dr. W. Georgii and F. Stamer, 259; Wilbur Wright Lecture on Development and Progress of Aircraft Engines, by H. R. Ricardo, 738. See LETTERS, 776, 838

Aeronautics :

Aeronautical Progress, 1914-1930, 611
— Research Committee, Work of, 612
Aeroplane Design, Progress in, 611
— Fokker Monoplanes for Australian Air Service, 412
— Oleo-Pneumatic Shock Absorber for (Blackburn Aeroplane & Motor Co., Ltd.), 647*
— Spin in, 674
— Wings, Handley-Page Auto-Slot for, 613
Aircraft Carrier "Saratoga," Trial Trip Data, 263
— Classifications, British Corporation Register, Report, 549
Airport of St. Hubert, Montreal, Canada, 842*
Airship "Graf Zeppelin," Propeller-Shaft Failures in, 43
— Mooring-Strain Indicator (Cambridge Instrument Co., Ltd.), 584*. See 273*
— — Tower, St. Hubert, Montreal, 842*
— Progress in Design, 613
— "R. 101," 187*, 271*. See 584*
Airway Beacon, Winnipeg, 701
— Australian National Airways, Ltd., Fokker Monoplanes for, 412
Autogyros, Comparisons with Aeroplanes, 611
Aviation Advisory Committee, Lloyd's Register, 108
Beacon, Airway, Winnipeg, 701
Civil Aviation in Australia, 479
Direction Finder, Wireless, for Aircraft, 129

Aeronautics—*continued.*

Engines, Aeroplane, Progress in, 611
— Aircraft, Lectures at King's College, London, 254
— Oil, Aeroplane (Junkersmotorenbau G.m.b.H.), 471*
— — Beardmore Tornado, for Airship "R. 101," 271
— Petrol, Aeroplane, Supercharging and Compounding, 738. See LETTERS, 776, 838
— — Aeroplane, Boost Gauge for (Negretti & Zambra), 130
— — Aeroplane, Townend Ring for, 703
Flight of Pterodactyls, 643
Forrest Lecture on Aeronautical Progress, 1914-1930, 611
German Experimental Station for Aerial Navigation, Year-Book (Review), 100
Gliding Association, British, Formation of, 201
— Progress in Germany, 259
Propeller-Shaft Failures, Airship "Graf Zeppelin," 43
Rocket Flight, Theory of (Review), 275
Shock Absorber, Oleo-Pneumatic, for Aeroplanes (Blackburn Aeroplane & Motor Co., Ltd.), 647*
Spin in Aeroplanes, 674
Townend Ring for Aero Engines, 703
Wind Resistance of Motor Cars, 802
— Tunnel, Variable-Density, National Physical Laboratory, 808*
See also PARAGRAPH INDEX
Aeroplanes. See *Aeronautics*
Africa, East, Economic Conditions in, Report, 512
Age-Hardening of Copper-Phosphorus Alloys, 524
Agricultural Hall. See *Exhibition*
— Machinery Exhibition, Paris, 431
— — Industry, Position and Prospects, 289
— Motors. See *Engines; Motors; Tractors*
— Tractors. See *Tractors*
Agriculture, Electric Power Supply in, 804
— and Fisheries, Ministry of, Tests of Dicol Heavy-Oil Burner, 300*
— See also *Irrigation* and PARAGRAPH INDEX
Air, Compressed. See *Compressed Air; Pneumatic*
— Compressor and Electric Generator, Oil-Engine Driven (Norris, Henty & Gardners, Ltd.), 204*
— — High-Pressure (G. & J. Weir, Ltd.), 506*
— Heaters for 600-lb. Pressure Yarrow Boilers, 406*. See 416
— Oxygen and Nitrogen from, Linde Process, 163*
— Preheaters, Application of Regenerative Principle, 155
— — Ljungström, Tests of, 155
— Pump. See *Pump*
— Resistance of Motor Cars, 802
— Screws. See *Propellers* under *Aeronautics*
— Waves Produced by Meteor, 669
— See also *Atmospheric*
Aircraft Carriers. See *Aeronautics*
— See *Aeronautics*
Airedale Electrical & Manufacturing Co., Ltd., Air-Break Starter for Three-Phase Motors, 32*. See *Erratum*, 46
Airships. See *Aeronautics*
Ajax-Northrup Electric Furnace (Electric Furnace Co., Ltd.), 219
"Akagisan Maru," M.S., Performance of, 186
"Akibasan Maru," S.S., Performance of, 186
Alabaster, H., the Late, 105
Alberta, Hydro-Electric Power Developments, 62
Alexander, F. H., on the Stability of Vessels with List, 515
Alexander, J., on Reconstruction of Kent and Leven Viaducts, London, Midland & Scottish Railway, 426
Alexander, Lieut.-Comdr. J. T., on Trial Trip Data of U.S.S. "Saratoga," 263
Alfa-Laval Co., Ltd., Marine-Type Oil Separator, 199*
Algoma Steel Corporation, Electro-Metallurgical Plant at Sault Ste. Marie, Ontario, 256
Alig & Baumgärtel, Power-Operated Scraper, 519*
Allan, P., the Late, 826
Alldays & Onions, Ltd., Foundry Appliances, 211
Allen, N. P., on Soundness of Copper Ingots, 457*. See 384
Allen, W. H., Sons & Co., Ltd., Oil-Engine Generator Sets, 206; Turbine-Driven Bore-hole Pumping Plant, 710, 713*, 751*
Allgemeine Transportanlagen Gesellschaft, Portable Belt Conveyor, 473*
Alloys. See *Metallurgy; Microphotographs;* PARAGRAPH INDEX
Alluvium, Stable Channels in, 179
Alternating Current. See *Electric*
— Stress. See *Tests* (*Materials*)
Alternators. See *Generators, Electric; Turbo-Generators*
Aluminium Alloys. See *Alloys* under *Metallurgy*
Aluminium Company of Canada, Ltd., Chute à Caron Hydro-Electric Power Plant, 323
— Conductors, Standard Specification, 445
— Effect on Nickel-Chromium Alloys, 813*
— Ingots, Casting of, 554
— Pavilion, Liége Exhibition, Belgium, 829
— for Rotor-Windings, 423
— See also *Metallurgy; Metal-Price Diagrams*
American Falls Dam, Snake River, Idaho, Uplift Diagram, 182*
— Iron and Steel Institute. See *Iron and Steel*
— Navy. See *United States* under *Warships*
— Society of Automotive Engineers. See *Automotive Engineers*
— — of Civil Engineers. See *Civil Engineers*
— — of Mechanical Engineers. See *Mechanical Engineers*
— — of Naval Architects and Marine Engineers. See *Naval Architects*
— — for Testing Materials. See *Testing*
— See also *United States*
Ammonia Production from Coke-Oven Gas, Mont Cenis Colliery, 163*
Amsteldiep Storage Lake, Zuyder Zee Reclamation Works, 762*
Amsterdam, Port of, Entrance Lock, North Sea Canal, 3*, 67*
Analysis, Metallurgical, Select Methods (Review), 162
— and Sampling, Coal, Royal Ordnance Factories, Woolwich, 587
— Spectrographic, Rates Ultimes Powders, 52
Anchorage, Gate, Welland Ship Canal Reconstruction, 400*
— Sydney Harbour Bridge, 495*, 533*
Ancient Egyptian Implements, Metallography of, 641
Anderson, J. W., the Late, 635
Andre, T. B., & Co., Ltd., Silentbloc Flexible Bearing, 522*
Anglin Norcross, Ltd., Engineering Equipment, Royal York Hotel, Toronto, 278*
Anglo-Persian Oil Co., Variable-Compression Fuel-Research Set, 44*; 80-ton Railway Wagon for 3-ft. Gauge, 102*
Annealing of Commercial Glassware, 195
— See also *Heat Treatment* under *Metallurgy*
Annual Publications. See LITERATURE INDEX
"Antelope," H.M. Destroyer, 536
"Anthony," H.M. Destroyer, Trials, 196
Anti-Friction Metals. See *Alloys* under *Metallurgy*
Antimony Alloys. See *Alloys* under *Metallurgy*
— Prices. See *Metal-Price Diagrams*
Antwerp, International Exhibition, 548
— Potash Storage and Shipment Plant, 305*, 365*
Apparatus, Scientific, Exhibition, Royal Society Conversazione, 643, 675, 823
— — Physical and Optical Societies' Exhibition, 52*, 86*, 128*. See 323, 343
Applied Mechanics, Third International Congress for, Stockholm, 450
Appointments. See PARAGRAPH INDEX
Apprenticeship in Building Trades, 707
— and Skilled Employment Association, Annual Report, 839
— See also *Education*
Arakawa River, Japan, Improvement Works, 18
Arapuni, New Zealand, Hydro-Electric Scheme, Hydraulic Jet Dispersers, 132*
Arc. See *Electric; Furnace; Welding*
Arch Bridge, Sydney Harbour, Erection of Main Span, 495*, 533*
— Dam, Dordogne River, Marège, France, 578
— — Laminated, with Forked Abutments, 578
Archbutt, S. L., on the Effect of Phosphorus on Copper, 522*. See 385. See *Erratum*, 436
Architects, Naval. See *Naval Architects*
Area Gas Supply, Departmental Committee Report, 705. See 699
Argentina, Buenos Aires, British Empire Trade Exhibition, 71, 448, 509
Argentine Republic, Economic Conditions in, Report, 447. See LETTER, 517
Argersinger, R. E., on Voltage and Frequency, 268
Arizona, Gila River, Coolidge Multiple-Dome Dam, 193*, 276*, 368*
Armstrong, Whitworth & Co. (Engineers), Ltd., Variable-Compression Fuel-Research Set, 44*
Arnold, Prof. J. O., the Late, 450*
Arrester, Mercury, High-Voltage, 93
Arrol, Sir W., & Co., Ltd., 25-ton Electric Crane, H.M. Repair Ship "Resource," 12
"Arrow," H.M. Destroyer, Trials, 478
Arthur Kill Bridges, New York, Cost of, 113
Arts, Royal Society of, Thomas Gray Prizes in Science of Navigation, 454
Asano Portland Cement Co., Nishitama Works, 18
Asbestos Industry, Suppression of Dust in, Report, 577
Ashop, River, Diversion of, 301
Asquith, W., Ltd., Direct Motor-Driven Radial Drilling Machine, 426*
Assessment of Compensation Water, Report, 832
Association, British. See *British Association*
— Engineering. See *Institutions*
Assouan Dam, Sluice-Discharge Measurements, 23; Heightening of, 101*
Aston, Dr. F. W., on Isotopes, 461*
Aston's Work on Mass Spectra, 397*, 437*, 470*
Astronomy, Photographs of New Planet, 643
Atkinson, Kier Brothers & Spicer Co., Coolidge Multiple-Dome Dam, 193,* 276*, 368*
Atlantic Liners. See *Steamers*
Atlantic Refining Co., Oil-Tanker "Brunswick," Performances, 513, 519*
— Trade, Protection of, 111
Atmospheric Action and Fatigue in Lead, 390, 423*
— Pollution, Report on, 825
Atomic Nuclei and their Structure 371* 397* 437* 470*
Attock Bridge, River Indus, Reconstruction, 503
Austin, Dr. C. R., on Nickel-Chromium Alloys for High Temperature, 780*, 811*. See 641
Australia, Central, Minerals in, 479
— Civil Aviation in, 479
— Economic and Trade Conditions in, Report, 228, 674
— Institution of Engineers, Award of Prizes, 254; Simultaneous Meeting, 676
— New South Wales, Floating Dock for Walsh Island Dockyard, 283*. See *Addendum*, 410
— — South Wales Irrigation Scheme, 351
— Pile-Driving Plant for Adelaide Harbour, 57*
— Queensland Railways, Annual Report, 231
— South, Railways of, Report, 290
— Sydney, Ferro-Concrete Elevated Water Reservoir, 137
— — Harbour Bridge, Erection of Main Span, 495*, 533*
— Victoria, Failure of Eildon Dam, 134
— Western, Water Supply of Perth, 484
Australian Air Service, Fokker Monoplanes for, 412
— Electrical Wiring Rules Committee, 507
— Shale, Retort for, 109
Autogeneous Welding. See *Welds* and *Welding*
Automatic Machine Tools. See *Machine Tools*
— Signalling. See *Signalling*
— Stokers. See *Stokers*
Automatic Telephone Manufacturing Co., All-Electric Totalisator, 269*
Automobile Engineers, Institution of, Relative Safety of Mild and High-Tensile Alloy Steels under Alternating and Pulsating Stresses, by Prof. B. P. Haigh, 231*. See 543. See also LETTERS, 632,* 710*
— See *Motor Cars*
Automotive Engineers, American Society of, Wind Resistance of Automobiles, by F. W. Pawlowski, 802
Auxiliary Machinery, Marine. See *Marine*
Avery, W. & T., Ltd., Rapid Gravitometer for Liquids, 215*
Aviation. See *Aeronautics*
Axles, Motor Car. See *Motor Car Details*

B.

BABCOCK & Wilcox, Boilers, Marine, United States Navy, 262; with Gilled Water Tubes, 421*; Lots Road Power Station, 443; S.S. "King George V," Explosion, 453; S.S. "Statendam," 491*, 513; York Street Mills, Belfast, 797*
Baguley (Engineers), Ltd., 80-ton Railway Wagon for 3-ft. Gauge, 102*
Bailey, R. W., on Creep of Steel under Simple and Compound Stresses, 265*, 327*; on Tubes and Cylinders under High Pressures and Temperatures, 772*, 785*, 818*
Bain, Dr. H. F., on Minerals in a Power-Sustained World, 836
Baird & Tatlock (London), Ltd., Exhibits at Physical and Optical Societies' Exhibition, 130
Bajac, Messrs., Planting Machine, 431
Baker, G. S., on the Resistance and Form of Towed Barges, 531
Bakers' Ovens, Steam-Heated, Explosions of, 453, 493
Balancing of Locomotives and Impact on Railway Bridges, 754*
— Marine Diesel Engines, 529, 551*
— System, Junkers Heavy-Oil Aero Engine, 472*
Balfour, Earl of, the Late, 415
Ball, Dr. F. E., on Locomotive Firebox Stays and Plates, 30
Ball Bearings. See *Bearings*
— Hardness Tests. See *Hardness* under *Tests (Materials)*
Band Conveyors. See *Conveyors*
Banerji, Dr. S. K., Electric Field of Overhead Thunderclouds, 669
Bansall, J. W., on Power Plant at Billingham, 350
Barco Manufacturing Co., Flexible Pipe Joints, 250
Barge Dock, Sydney Harbour Bridge, 534*
— Unloading Quay, Potash Storage and Shipment Plant, Antwerp, 305*
— Towed, Resistance and Form of, 531
Barnet District Gas and Water Co., Turbine-Driven Bore-Hole Pumping Plants, 710, 713*, 751*
Barrage, Nag Hamadi, River Nile, Construction Cableways, 252
"Barsonator" Werkzeug G.m.b.H., Graduated-Tooth Hack-Saw Blades, 518
Barton Power Station Extension, Operating Results, 597*, 684*, 718*, 739, 745*
Bassein Bridges, India, Rebuilding of, 503
Batteries. See *Electric*
Battleships. See *Warships*
Bauer, Dr. G., on the Exhaust-Steam Turbine, 156
Bauer, Prof. W., on Electric Power Plant Development in Germany, 267
Bauer-Wach Exhaust-Steam Turbine Installation, S.S. "City of Cambridge," 139
Bauxite, Purification of, Experiments, 571
— Softening and Melting Points of, 390, 392
Baynes, S. W., the Late, 200
Beacon, Airway, Winnipeg, 701
Beams, Curved, Plaster Models for Stress Determination in, 231
— Notched, Stress Distribution in, 516
— Tee, Ferro-Concrete, Design of, 591*
Beardmore-Caprotti Valve Gear, Locomotive, London and North Eastern Railway, 133*
— Tornado Oil Engines, Airship "R.101," 271
Bearings, Action of White-Metal Linings in, 378. See 23*
— Journal, Film Lubrication of, 22*
— Metals. See *Alloys* under *Metallurgy*
— Michell Journal, Application of, 23*
— — Thrust, Turbine-Driven Bore-Hole Pump, 714*
— Ring-Oiled, Researches on, 146*
— Roller, Plummer Blocks with (Ransomes & Marles Bearing Co., Ltd.), 462*
— Silentbloc Flexible (T. B. Andre & Co., Ltd.), 522*
— White Metal, Value of, 23*. See 378
Beauharnois Power Corporation, St. Lawrence River Hydro-Electric Scheme, 62
Beck, R. & J., Ltd., Metallurgical Microscope, 130; Optical Apparatus for Talking-Film Production, 823
Becker Coke-Oven Plant, Thorncliffe Coal Distillation, Ltd., 699*
Becker, Dr. M. L., on Reactions in Iron-Carbon Alloys, 642; on Alloys of Iron with Silicon, 653*. See 642
Becket, Dr. F. M., on Chromium-Manganese Steels, 749
Bedford Rural Electricity Scheme, 355*
Beekman, R. A., on Ship Propulsion and Power Plant Engineering, 156
Behalter und Apparatebau, G.m.b.H., Ruths Steam Accumulators, 764*
Belfast, York Street Mills, Electrification of, 795*
Belgian International Exhibitions, Liége and Antwerp, 548. See 829
Belgium, Coal Wages in, 680
— Electric Power Supply in, 92
— Liége Exhibition, Aluminium Pavilion, 829
Bell, H., Work of, 334
Belleville Boilers, Use of Malleable Cast Iron in, 50
Belsey, W. J., on Performance of Vessels with Electric Transmission Gear, 519*. See 513
Belt Conveyors. See *Conveyors*
Bends, Pipe, Hydraulic Losses in, 268
— — Stiffness of, 579
Bennett, W., on Great Lakes Bulk-Freighters, 262
Benson High-Pressure Boiler, Tests of, 89*
Benzole Recovery and Gas-Works Practice, 743
— — and Rectification Plant, Becker Coke-Oven Plant, Sheffield, 699*
"Berenice," S.S., Voyage to India, 500
Bergius Process, Liquefaction of Coal, Hydrogen Production Plant for, Duisburg, 165*
Berlin, Electric Power Supply in, 764
Berlin, Henningsdorf Substation, 7,500-kw. Diesel-Electric Generators, 411
— World Power Conference. See *World Power Conference*
Berliner Electricitätswerke A.-G., Ruths Accumulators at Charlottenburg Power Station, 764*
Berry, J. G., on Zinc-Base Die-Casting Alloys, 429.* See 399. See LETTER, 517
Berry, Sir W., Retirement and Work of, 34.
Berthiez, C., Etablissements, Planing Machine with Independent Cutting Drive, 476*
"Berwindglen," S.S., Design of, 262
"Berwindyale," S.S., Design of, 262
"Bessemer," Cross-Channel Steamer, History of, 96*
Bessemer Medals, Award to E. Schneider and Dr. W. Rosenhain, 582, 609
— Steel, the Case for, 413. See LETTER, 527
Beuthen, Silesia, Hohenzollern Colliery, Aerial Coal Transporter, 629*
Bevel Gears. See *Gears*
Beyer-Peacock Turbine Locomotive, Operating Results, 624
Bicycles. See *Cycles* and *Motor Cycles*
Biggs, H. C., on Glass-House Refractories, 525
Billingham Super-Pressure Power Station, 350
Binary Alloys. See *Alloys* under *Metallurgy*
Biplanes. See *Aeronautics*
Birmingham, British Industries Fair, 203*, 227, 261. See 295*, 438*
Birmingham Electric Furnaces, Ltd., 30-kw. Portable Electric Furnace, 219*
Birmingham Railway Carriage & Wagon Co., Ltd., Articulated Steam Rail Coaches, 715*
Birthday Honours List, 743
Bishop Wire & Cable Co., Electric Control Cable, 248
Bismuth Alloys. See *Alloys* under *Metallurgy*
Blache, H. H., on Marine Diesel Engines, 185
Blackburn Aeroplane & Motor Co., Ltd., Oleo-Pneumatic Shock Absorber, 647*
Blackstone & Co., Ltd., Horizontal Oil Engines with Spring Injection, 206
Blackwall Tunnel, Difficulties in Construction, 238
Blading, Steam Turbine, Naval, Materials for, 475, 486
"Blanche," H.M. Destroyer, Launch, 744
Blast Furnaces. See *Furnaces*
Block and Slab Machine, Concrete (Lee & Fouracre), 211
Blowers, Soot, for "Wood" Steam Generator, 152*
— Steam-Air, for Roll Cooling, 615*
Blythe, Dr. G. E. K., on Pulverised Fuel, 184
Board of Education, National Certificates in Building Technology, 88
— of Trade Report on Area Gas Supply, 705. See 699
— — Reports, Boiler-Explosion Inquiries, 453, 493, 577
— — Report on Coal-Gas Poisoning, 261
— — See also *Overseas Trade Department*
Boat Davit, Gravity, and Winch (S. Taylor & Sons (Brierley Hill), Ltd.), 668*
— Submarine. See *Warships*
Bohm und Kruse, Box-Nailing and Box-Printing Machines, 311*
Böhringer, Gebr., G.m.b.H., 11-in. Lathe, 341*. See *Erratum*, 408
Boilers, Babcock & Wilcox, with Gilled Water Tubes, 421*
— — & Wilcox, Lots Road Power Station, 443
— — & Wilcox, S.S. "King George V," Explosion, 453
— — & Wilcox, S.S. "Statendam," 491*, 513
— — & Wilcox, York Street Mills, Belfast, 797*
— Benson High-Pressure, Tests of, 89*
— Drums, Strength of Dished Ends, 190*. See LETTER, 517
— Explosion Inquiries, Board of Trade Reports, 453, 493, 577
— Feed Pump. See *Pump*
— — Water Softening. See *Water Softening*
— Flues, Dust and Cinder Trap for (Green Fuel Economiser Co.), 248
— Furnaces. See *Furnace* and *Stoker*
— Heating Surfaces of, 155
— High-Pressure and High-Temperature, 406*, 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
— — Pressure, in United States, 154
— Hot-Water, All-Steel Sectional (Davey, Paxman & Co., Ltd.), 206
— House Operation and Pulverised Fuel, 740
— Lancashire, Blast-Furnace Gas Burners for, 589*
— — and Water-Tube, Operating Costs, 579, 620
— at Langerbrugge, Working Temperature in, 416
— Locomotive, Alloy Steels for, 626
— — Investigations on Firebox Stays and Plates, 30
— — Tests of Dicol Heavy-Oil Burner for, 300*
— — Type, for Rail Coach (Yorkshire Patent Steam Wagon Co.), 716*
— — See also *Locomotive*
— Marine, Early Experience with, 498
— Plant, Barton Power Station Extension, Operating Results, 597*, 684*, 718*, 739, 746
— — Operation, Royal Ordnance Factories, Woolwich, 585*, 579, 618*, 650*
— — Principles of Design, 154
— Problems, Modern, 673
— Scaling Tools, Rotary, Electrically-Operated (Consolidated Pneumatic Tool Co., Ltd.), 63*. See *Erratum*, 79
— Stirling, Explosion of, 577
— for Super-Pressure Steam, 58*
— Tests, Västerås Power Station, Sweden, 155
— Tubes, Experiments at High Temperatures and Pressures, 49
— — Gilled, for Combustion Chambers, 421*
— — Heat Transmission through, 143, 149
— — Naval, Materials for, 473*, 486
— — Thickness of, 527*. See LETTERS, 632*, 679, 711, 776
— Water-Tube, Belleville, Use of Malleable Cast Iron in, 50
— — Tube, Calculations Relating to (Review), 100
Boilers, Water-Tube, East River Power Station, New York, Record Performance, 137
— — Tube, Marine, Babcock & Wilcox, for United States Navy, 262
— — Tube, Marine, Copper Tubes in, 49
— — Tube, Strength of Dished-End Drums 190*. See LETTER, 517
— — Tube, Super-Pressure, Billingham Power Station, 350
— — Tube, Yarrow, 600-lb. Pressure, at Castner-Kellner Alkali Works, 406*. See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
— Welded Joints in, 353, 362, 386
— "Wood" Radiant-Heat, Experiences with, 143, 149*, 177. See LETTER, 263
— See also *Engines and Boilers* in PARAGRAPH INDEX
Bolts, Steel, Naval, Materials for, 476
Bombay, Baroda & Central India Railway, Rebuilding of Bassein Bridges, 503
Bone, Prof. W. A., on Interaction of Gases and Ore in Blast Furnace, 647*. See 609
Books, New, Notes on, 264, 419, 440, 505, 550, 751, 784. See LITERATURE INDEX
— Received, 14, 46, 78, 108, 138, 200, 254, 284, 346, 378, 410, 508, 540, 572, 636, 670, 702, 734, 766, 798, 828
Boost Gauge for Supercharged Aero Engines, (Negretti & Zambra), 130
Booth, J., & Bros., Ltd., 5-ton Shipyard Crane, 253*
Bore Hole, Enlarging by Explosives, Guildford, 298*
— — Pumping, Application of Steam Turbines to, 713, 751*. See 710
"Boreas," H.M. Destroyer, Launch, 798
Boring Machine. See *Machine Tools*
Borquist, W. D., on Household and Rural Electrification in Sweden, 92
Borsig, A., Ruths Steam Accumulators, 764*
Böttcher und Gessner, Dovetailing Machine, 310*
Bottoming Machine for Tins, 373*
Boulton & Paul, Ltd., Airship "R.101," 187*, 271*; Townend Ring for Aero Engines, 703
Bouncing-Pin Apparatus, Measurement of Detonation in Petrol Engines, 44*
Box-Nailing and Printing Machines (Bohm und Kruse), 311*
Bradfield, Dr. J. J. C., Sydney Harbour Bridge, Erection of Main Arch Span 495*, 533*
Bragg, Sir W., on Structure of Cellulose, 525*
Brakes, Rail, for Marshalling Yards, 724
— Railway, Testing Set, (Heatly-Gresham Engineering Co., Ltd.), 208*
— See also *Dynamometer*
Brand, C., & Son, Portishead Power Station, Circulating-Water Culverts, 433*
Brand, F. F., on Large Power Transformers, 93
Brass, Aluminium, Properties of, 398, 554*
— Corrosion of. See *Corrosion*
— Ingots, Macrostructure of, 357*, 384
— Tubes, Hard-Drawn, Initial Stresses in, 65*
Brassey's Naval and Shipping Annual (Review), 500
Braun, F., A.-G., Radial Drilling Machine, 309*
Breakdowns. See *Accidents*
Brenforce Travelling Scholarship, 604
Brick and Concrete Culverts, Portishead Power Station, 433*
— Fire. See *Firebricks; Refractory Materials*
Bridge, Attock, across River Indus, Reconstruction, 503
— Bassein, India, Rebuilding of, 503
— Construction in New York, Financing of, 113
— Ferro-Concrete, Beams for, 591*
— Forth, Difficulties in Construction, 238
— — Proposed Road Traffic over, 234
— Kent and Leven Viaducts, Reconstruction of, 426
— Liskeard Viaduct, Reconstruction of, 425
— Lower Sone, India, Re-Girdering of, 562. See *Erratum*, 697
— Manchester Ship Canal, Heavy Traffic over, Lawsuit, 411
— Railway, Walton Hall Avenue, Liverpool, Replacement of, 696*
— — Static and Dynamic Stresses in, 754*
— River Godavery, India, Handling and Erecting Gear, 160*
— Royal Albert, Saltash, Reconstruction of Approach Spans, 425
— Scheme, Charing Cross, 114, 640
— Swing, Folkestone Harbour, Replacement of, 645*
— Sydney Harbour, Erection of Main Arch Span, 495*, 533*
— See also PARAGRAPH INDEX
Brightside Foundry and Engineering Co., Ltd., Rolling Mill Plant, 103*
Brinell Tests. See *Hardness* under *Tests (Materials)*
Bristol Corporation, Portishead Power Station, Circulating-Water Culverts, 433*
— Meeting, British Association, See *British Association*
— Temple Meads Railway Station, 605
Bristow, R. C., on Cochin Harbour Works, 331
"Britannia," S.S., Atlantic Voyages of, 62
"Britannic," M.S., White Star Liner, 836*
British Architects, Royal Institute of, Scholarship, 734
— Association, Bristol Meeting, Programme, 567, 833
British Catadyn Co., Ltd., Water-Sterilisation System, 301
— Columbia Association of Professional Engineers, 768
— — Hydro-Electric Developments, 62, 829
— Compressed Air Society, Formation of, 550
— Corporation Register of Shipping and Aircraft, Ship Register, 323; Annual Report, 549
— Electrical and Allied Industries Research Association, Work of, 196
— — Development Association, Work of, 544
— Empire Trade Exhibition, Buenos Aires, 71, 448, 509
— Engineering Standards Association. See *Engineering Standards*
— Gliding Association, Formation of, 201
British Industries Fair, Birmingham, 203*, 227, 261. See 295*, 438*, 605
British Jeffrey-Diamond, Ltd., Single-Roll Crushing Machine, 811*
— Motor Taxation, Influence on Petrol-Engine Design, 303*. See LETTERS, 776, 804
— Navy. See *H.M.*, under *Warships*
— Non-Ferrous Metals Research Association, Investigations on Locomotive Firebox Stays and Plates, 30; Researches on Cast-Copper and Bronze, 353*, 3-4, 457*, 522*
"British Queen," S.S., Atlantic Voyages of, 692
— Railways. See *Railways*
British Rema Manufacturing Co., Ltd., Coal-Pulverising Plant, 226*
British Reverberatory Furnaces, Ltd., Oil-Heated Furnace, 226
— Shipbuilding. See *Shipbuilding*
— Shipping. See *Shipping*
British Sousedik Electric Motors, Ltd., Automatic Starter for Three-Phase Motors, 106*
British Steel Piling Co., Ltd., Pile-Driving Plant, Adelaide Harbour, 57*; Transit Concrete Mixer, 631*
British Thomson-Houston Co., Ltd., Flange-Type Motor for Machine Tools, 221*; 11,000-volt Vertical-Plugging Switchgear, 221*; All-Electric Totalisator, 269*; Switchgear, Lots Road Power Station, 443; Switchgear, Central Scotland Electricity Scheme, 601*
— Trade. See *Trade*
Broadhead, C. F., on a New Road Binder, 742
Bromilow & Edwards, Ltd., High-Lift Lorry-Tipping Gear, 618*
Bronze Castings, Unsoundness in, 358*, 384
— Early Production of, 352
Brookes (Oldbury), Ltd., High-Speed Geared Guillotine Shears, 226
Brown, Boveri & Co., Ltd., 32,500 kv.-a. Slow-Speed Alternators, 743*
Brown Coal, Low-Temperature Carbonisation of, 50, 184
Brown, D., & Sons (Huddersfield), Ltd., Manufature of Gearing at Park Works, 559*, 693*. See *Erratum*, 744
Brown, J., & Co., Ltd., S.S. "Empress of Britain," Launch, 773; Variable-Density Wind Tunnel, 708*
Brown, S. G., on Gyro-Compass for Gunfire Control, 323
Brown, W., the Late, 10
Browns Dryers, Ltd., Electric-Oil Heat-Storage Equipment, 493
Brückner Weather Cycle, 143
Brule River Dam, Florence, Wisconsin, Uplift Diagram, 183*
"Brunswick," Diesel-Electric Oil-Tanker, Performances, 513, 519*
Brydges, J. K., on Electricity Supply, 693
Büchi Supercharger, Diesel Engines, M.S. "Maron," Trials of, 280. See LETTERS, 323, 418; M.S. "Dunbar Castle," 697
Buchli, J., on the Heat Economy of the Steam Locomotive, 266
Bucknall, E. H., on Locomotive Firebox Stays and Plates, 30
Budget, Canadian, and Empire Trade, 632. See *Erratum*, 683
Buenos Aires, British Empire Trade Exhibition, 71, 448, 509
Buffing and Polishing Set, Electrically-Driven (W. Canning & Co., Ltd.), 223*
Builders, Institute of, National Certificates in Building Technology, 88
Building Congress, New York, Work of, 706
— Construction. See also *Ferro-Concrete* and PARAGRAPH INDEX
— Contracts, Standard Conditions, 707
— Corrosion of Lead in, Report, 494
— Electrical Heating of, 741
— Financial and Credit Facilities for, 706
— High, in United States and Canada, 581
— Illumination of, "Daylight Factor" in, 550
— Industry, Rationalisation in, 706
— and Public Works International Congress, London, Reports on Rationalisation in Building Industry, 706; New York Building Congress, Organisation and Activities, by R. D. Kohn, 706; Report on Financial and Credit Facilities, 706; Discussion on Scientific Research in Buildings and Public Works, 707; Discussion on Standard Conditions of Contract, 707; Reports on Working-Class Houses, 707; Discussion on Apprenticeship in Building Trade, 707; Discussion on Education and Training in Building Trade, 707
— Research Board, Report, 142; Report on Protection of Mortar and Concrete against Frost, 237
— — Station, Report on Corrosion of Lead in Buildings, 494; Microvolt-Hour Meter, 675
— Steel Structures for, Canadian Specification, 811
Buist, D. M., on Power Plant at Billingham, 350
Bullets, Leather, for Cleaning Condenser Tubes, 718*
Bureau of Mines. See *United States*
— of Standards. See *United States*
Burkhardt, J. E., on Colliers "Berwindglen" and "Berwindyale," 262
Burma, Port of Rangoon, Annual Report, 231
Burmeister & Wain, Diesel Engine Construction, 185
Burners for Blast-Furnace Gas, 588*
— Heavy-Oil, Dicol, 300*
— Pulverised Fuel (Riley Stoker Corporation), 250*
Burr, J. W., on Electrical Heating of Buildings, 741
Butane for Carburation of Water Gas, 148
Buttresses, Coolidge Multiple-Dome Dam, 276*

C.

CABLES, Anchorage, Sydney Harbour Bridge, 495*, 533*
— See also *Wire Ropes* and *Electric*
Cableway. See *Wire Ropeway*
Cadmium, Electro-Deposited, Protective Value of, 389*, 398

Cages, Mine, Signalling from, 54
Cahokia Power Station, Data on, 299
Caillard, Sir V. H. P., the Late, 418
Caissons, Blackwall Tunnel, 239
— Entrance Lock, Ymuiden, North Sea Canal, 68*
— Foundation, Forth Bridge, Construction of, 238
"Calais-Douvres," Cross-Channel Steamer, History of, 96
Calcium Chloride for Protection of Concrete against Frost, 237
Calcutta, Cable Tunnel under River Hooghly, 124
Californian Petroleum Industry, Fatalities in, 324
Callendar, Prof. H. L., the Late, 115*
— Work on Properties of Steam, 257
Cambridge Instrument Co., Ltd., Seismograph for Geophysical Surveying, 52*; Universal Deflectograph, 52*; Mutual Inductometer, 53*; Micro-Ammeters, 54*; Recording Colorimeter, 54; Humidity Record, 54; Vacuo Thermo-Junction, 54; Airship Mooring-Strain Indicator, 584*. See 273*: Recording Microphotometer, 643; Leaky-Harper Drawing Machine, 644
Cammell Laird & Co., Ltd., Explosion of Stirling Boiler, 577
Campbell Mutual Inductometer (Cambridge Instrument Co., Ltd.), 53*
Canada, British Columbia, Hydro-Electric Developments, 62, 829
— Development of Lignite Deposits, 455
— Diesel Engine Installations in, 124
— Engineering Institute of, St. Hubert Airport, by R. de B. Corriveau, 842*
— Fort Churchill Harbour Works, 71
— High Buildings in, 581
— Hudson Bay Railway, Proposed Connections with, 355
— Hydro-Electric Power Development in, 62, 536, 829. See 124
— Montreal, St. Hubert Airport, 842*
— Ontario, Sault Ste. Marie, Electro-Metallurgical Plant at, 256
— Peace River and Vancouver Railway, Proposed, 255
— Quebec, Chute à Caron Hydro-Electric Power Plant, 323
— — Saguenay and Chibougamau Railway, Progress of, 550
— — St. Francis River, Proposed Hydro-Electric Plant, 147
— Registrations of Engineers in, 768
— River Churchill Hydro-Electric Power Plant, 442
— St. John Harbour Extension, 720
Canada Steamship Lines, Ltd., M.S. "Grainmotor," 124
— Testing Electrical Appliances in, 669
— Toronto, Royal York Hotel, Engineering Equipment, 278*
— Water-Power Resources, 124
— Welland Ship Canal Reconstruction. See *Welland Ship Canal*
— Winnipeg Airway Beacon, 701
Canadian Budget and Empire Trade, 632. See *Erratum*, 683
— Department of Mines, Investigations of Fuels and Fuel Testing, 234
— Electrical Code, 449
— Engineering Standards Association, Specifications, Steel Bars and Billets, 252
— General Electric Co., Ltd., Airway Beacon, 701
— Pacific Liner "Empress of Britain," Launch, 773
— — Railway, Royal York Hotel, Toronto, Engineering Equipment of, 278*; Branch-Line Construction Programme, 518
Canadian Vickers, Ltd., Airship Mooring Tower, St. Hubert Airport, 842*
Canal, Discharge, Zuyder Zee Reclamation Works, 762*
— Manchester Ship, Traffic Statistics, 486
— North Sea, Ymuiden Entrance Lock, 3*, 67*
— Panama, Annual Report, 230
— Rocky River, Hydro-Electric Plant, 37*
— Velocity, Depth and Silt Transport Formulæ, 179
— Welland Ship, Canada, Reconstruction, 157*, 241*, 336*, 400*, 468*, 592*, 663*, 711*, 725*, 790*
— See also PARAGRAPH INDEX
Candee, A. H., on Internal-Combustion Engines in North American Rail Transportation, 117
Canning, W., & Co., Ltd., Polishing and Buffing Set, 223*; Electroplating Dynamo, 223*
Cantilever Bridge. See *Bridge*
— Tubes, Forth Bridge, Alignment of, 238
Capacity. See *Electric*
Capital and Labour. See *Labour*
Caprotti-Beardmore Locomotive Valve Gear, London & North Eastern Railway, 133*
Capstan Lathe. See *Lathe* under *Machine Tools*
Carbofrax Firebricks for Boiler Furnaces, 248
Carbon Deposition in Blast Furnace, 609, 647
— Dioxide, Effect on Copper and Bronze, 358*, 384. See 457*
— — Scrubbers, Ammonia Production Plant, 163*
— Monoxide, Combustion of, 589, 610
— — Effect on Copper, 457*. See 384
— — in Gas Manufacture, 261
— — from Motor Cars, Risks from, 295
Carborundum Co., Carbofrax Firebricks for Boiler Furnaces, 248
— Composition and Properties of, 392
Carburation of Water Gas, Butane and Propane for, 148
Carburising Reactions in Iron-Carbon Alloys, 642
Cardington, Airship Mooring Tower, 271*. See 584*
Carels Marine Oil Engine, Tug "Irande," 106*
Cargo Steamers. See *Steamers*
"Carnarvonshire," S.S., Explosion of Stop Valve, 493
Carnegie, F., on Production and Distribution of Steam in Factories, 585*, 618*. See 579, 650*
Carpenter, Electric (Woodworking Machinery Co., Inc.), 688*
Carpenter, Prof. Sir H. C. H. on Metallography of Ancient Egyptian Implements, 641; Exhibits at Royal Society Conversazione, 823
Carriages, Railway, All-Steel, Use of, 789
— — Oil Engine-Driven, with Electric Transmission, Italian State Railways, 7*
— Steam Rail, Articulated, for Egyptian State Railways, 715*
Cars, Motor. See *Motor Cars*
Cast Iron, Admiralty Specification, 475
— — Grey, Effect of Melting Conditions on, 643
— — Malleable, Use in Belleville Boilers, 50
— — Metallurgy and Production of (Review), 453
"Castalia," Cross-Channel Steamer, History, 96
Castings, Bronze, Unsoundness in, 358*, 384
— Centrifugal, of Worm-Wheel Blanks (D. Brown & Sons (Huddersfield), Ltd.), 696
— Steel, Naval Experience with, 475, 486
Castner-Kellner Alkali Co., 600-lb. Pressure Yarrow Boilers, Design and Performance, 406*. See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
Catadyn Water-Sterilisation System, 301
Catalogues, 61, 93, 148, 239, 270, 301, 332, 396, 429, 462, 494, 524, 557, 590, 620, 654, 687, 720, 784, 813. See PARAGRAPH INDEX
Catchwater Drain, Zuyder Zee Reclamation Works, 761*
Caterpillar Tractor. See *Tractor*
Catterson-Smith, R. M., Electric Furnaces, 128*
Cell, Kreuger, Measurement of Impact Forces, 70
Celluloid Models, Stress Determination by. See *Optical*
Cellulose, Molecular Structure of, 525*
Cement, Investigations by Building Research Board, 142
— Kiln, Rotary, Pulverised-Fuel Firing, 185
— Mortar, Protection Against Frost by Salts, 237
— — Tensile Tests of, 67*
— See also *Concrete* and PARAGRAPH INDEX
Cementite, Spheroidisation in Superheater Tube, 265
Census, Road Traffic, 1928, Report, 414
Centenary, Faraday, Programme, 832
— of Fourier, 675
— of F. A. Winsor, 740
Central Station. See *Power Station*
Centrifugal Casting of Worm-Wheel Blanks (D. Brown & Sons (Huddersfield), Ltd.), 696
— Ore Concentration, Experiments on, 775
— Pumps. See *Pumps*
Chadwick, J., & Co., Ltd., Explosion of Cast-Iron Stop Valve, 453
Chain Feeder for Materials (Ross Patents, Ltd.), 211
— and other Lifting Appliances, Report, 241
— Track Tractor. See *Tractor*
Chamber, Recompression, Use in Hudson River Tunnel, 238
Change Speed Gear. See *Gear*; *Motor-Car Details*
Channels, Stable, in Alluvium, 179
— Steamers "Bessemer," "Castalia," and "Calais-Douvres," 96*
— Tunnel Committee, Report, 381
Charing Cross Bridge Scheme, 114, 640
"Charlotte Dundas," S.S., History of, 333
Charlottenburg Power Station, Ruths Steam Accumulators, 155, 764*
— Technical High School, Tests of Benson Boiler, 89*
Charter, Royal, Institution of Mechanical Engineers, 769
Chatfield, R. S., on Electricity Committees and Municipal Electricity Undertakings, 698
Chelsea Polytechnic, Demonstrations in Photomicrography, 487
Chemical Corrosion of Refractory Bricks, 391
— Industry, Society of, Developments and Problems in Coal Cleaning, by Dr. F. S. Sinnatt and D. T. Davies, 449
Chemistry, Investigation of Isotopes, 461*
— Molecular Structure of Cellulose, 525*
— Transmutation of Matter, 549*
— See also PARAGRAPH INDEX
Cheshire Lines Committee, Replacement of Railway Bridge, Liverpool, 696*
Chile, 300-h.p. Diesel Locomotive for, 324*
Chilled-Iron Rolls, Manufacture of (Review), 274
Chimney, Brick, Provision for Steeplejack's Ladder in, 796
China, Economic Conditions in, Report, 288
— Yunnan, Mineral Resources of, 32
Chitani, Y., on Petroleum Resources of Japan, 184
Chlorinator, Water (Royles, Ltd.), 216*
Chorlton, A. E. L., on Railway Traction by Oil Engines, 110
Christie, S. P., Two-Stroke Gas-Pump, 404*
Chromium-Copper Structural Steels, Properties of, 642, 687*
— Electro-Deposited, Protective Value of, 389*, 398. See 94*
— Plating, Process of, 94*. See 389*, 398
— Steels, Properties of, 643, 680*, 749
Chuck. See *Machine Tools*
Churchill, Harbour Works, Hudson Bay, 71
Churchill Machine Tool Co., Ltd., Roll-Grinding Machine, 538*. See *Erratum*, 640
— River, Canada, Hydro-Electric Plant, 442
Chute à Caron Hydro-Electric Plant, Canada, 323
Chute, Telescopic, Potash Storage and Shipment Plant, Antwerp, 306*, 365*
Cinder Trap, Boiler-Flue (Green Fuel Economiser Co.), 248
Circular Saws. See *Saws* under *Machine Tools*
Circulating Pumps. See *Pumps*
— Water Culverts, Portishead Power Station, 433*
"City of Cambridge," S.S., Bauer-Wach Exhaust-Steam Turbine Installation, 139
Civil Aerial Transport. See *Aeronautics*
— Engineers, American Society of, Laminated Arch Dams with Forked Abutments, by Dr. F. A. Noetzli, 578

Civil Engineers, Institution of:
Railway Traction by Oil Engines, by A. E. L. Chorlton, 110
Stable Channels in Alluvium, by G. Lacey, 179
Annual Dinner, 290
Diversion of the River Ashop, by R. W. S. Thompson, 301
Cochin Harbour Works, by R. C. Bristow, 331
Development of Lyttelton Harbour, New Zealand, by C. J. R. Williams, 332
Tyne Commission Quay, North Shields, by R. F. Hindmarsh, 332
Reconstruction of Liskeard Viaduct and Scheme for Reconstruction of Approach Spans, Royal Albert Bridge, Saltash, by H. D. Smith, 425
Reconstruction of Approach Spans, Royal Albert Bridge, Saltash, by F. Gibbons, 426
Reconstruction of Kent and Leven Viaducts, Furness Section, London, Midland and Scottish Railway, by J. Alexander, 426
Rebuilding of Bassein Bridges on Bombay, Baroda and Central India Railway, by B. B. Haskew, 503
Reconstruction of Attock Bridge across the River Indus on North Western Railway, India, by W. T. Everall, 503
Report of Committee on Deterioration of Structures in Sea Water, 544
James Forrest Lecture on Aeronautical Progress, 1914–1930, by Prof. R. V. Southwell, 611
Conversazione and Exhibition, 772
Clark, F. S., On Thermal Electric Plant, 154
Clarke, C. W. G., On Utilisation of Waste Heat in Steel Industry, 749
Clarke, Chapman & Co., Ltd., Control System for Electric Winches, 483; Evaporator with Continuous-Cleaning Mechanism, 774*
Claxton, G., on Benzole Recovery and Gas Works Practice, 743
Clay, Fluidity of, 134. See 689*, 753*
— Foundations, Bearing Capacity of, 639
— Internal Friction of, Experiments on, 689, 753*. See 134
— Fire. See *Firebricks*; *Refractory Materials*
Cleaning Coal, Developments and Problems in, 449
Clerk, Sir D., on Rating Petrol Engines by Cylinder Dimensions, 368
"Clermont," S.S., History of, 334
Cleveland Bridge and Engineering Co., Ltd., Tilbury Passenger-Landing Stage, 678*
— Iron Prices. See *Metal-Price Diagrams*
— and the Northern Counties, Notes from 14, 46, 78, 109, 138, 170, 200, 255, 284, 316, 346, 378, 410, 445, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828. See PARAGRAPH INDEX
Climate. See *Meteorological*
Clyde River, Overhead Power Transmission Line, 803*
CO_2. See *Carbon Dioxide*
Coaches, Railway. See *Carriages*
Coal, Brown, Low-Temperature Carbonisation of, 50, 184
— Bunker and Cargo, Fires in Steamships, Report, 463
— Cleaning, Developments and Problems in, 449
— Dusts, Relative Inflammability of, Report, 536
— Exports of, 258
— Feeders, Revolving-Table, Becker Coke-Oven Plant, Sheffield, 699*
— Gas. See *Gas*
— Industry, International, Wages, in, 23, 252, 680
— — United States, Wages and Hours in, 252
— — Wages in Belgium, Poland and Great Britain, 680
— High-Temperature Distillation, Economic Problems of, 835
— Liquefaction of, Bergius Process, Hydrogen-Production Plant for, Duisburg, 165*
— Low-Temperature Carbonisation and Electricity Supply, 50
— — Temperature Distillation Experiments at Dunston Power Station, 184
— Mine. See *Colliery*
— and Ores, Dressing of (Review), 192
— Production and Preparation of, 804
— Pulverised. See *Pulverised Coal*
— Resources of Japan, 183
— Sampling and Analysis, Royal Ordnance Factories, Woolwich, 587
— Soft, as Domestic Fuel in Japan, 184
— Transportation and Distribution in Japan, 183
— Transporter, Aerial, with Travelling Tower (J. Pohlig A.-G.), 629*
— Washing Investigations, American, 196
— See also PARAGRAPH INDEX
Coaling-Plant, Locomotive, at Kipps, London and North Eastern Railway, 330*
Coats Machine Tool Co., Ltd., Monotron Hardness Indicator, 129
Cobalt-Chromium Steel, Properties of, 643, 682
Cobb, Prof. J. W., on Leeds University and Gas Research, 742
Cobee Hack-Saw Blade ("Barsonator" Werkzeug G.m.b.H.), 518
Cochin, India, Harbour Developments at, 331, 636. See LETTER, 679
Cochrane Corporation, De-Aerator for Domestic Water Supply, 120*; Multiport Back-Pressure Steam Valve, 120*
Coefficients of Discharge, Flow from Nozzles, 803
Coke, Bag Tests and Box Tests of, 590
— Oven Gas Decomposition, Linde Plant, 163*
— — Gas, Long-Distance Distribution, 705
— — Gas, Utilisation at Skinningrove, 588*, 610, 617*
— — in Gas Works, 742
— — Plant, Becker, Thorncliffe Coal Distillation, Ltd., 699*
— Production and Preparation of, 804
— Research Committee, Midland, Shatter-Test Apparatus, 745*
Coke Research Committee, Northern, Annual Report, 590
— Shatter-Test Apparatus for, 745*
Coker, Prof. E. G., on Lateral Extensometers, 465*; on Stress Distributions in Notched Beams, 516
Cold Storage. See *Refrigeration*
Cole, Dickin & Hills, Dicol Oil Burner, 300*
Coleman, G. P., on Stress Distribution in Notched Beams, 516
College. See *Education*
Collieries, Electric-Cable Connecting Box for (G. Ellison, Ltd.), 223*
— Signalling from Cages, 54
— Ventilation of, Physiological Problems, 295
Colliery Gate Ends, Portable Air-Break Circuit Breaker for (G. Ellison, Ltd.), 223*
— Hohenzollern, Aerial Coal Transporter with Travelling Tower, 629*
— Mont Cenis, Sodingen, Dortmund, Linde Plant for Coke-Oven Gas Decomposition, 163*
— See also *Mines* and *Coal*
Collisions. See *Accidents*
Colorado Dam, Uplift Diagram, 235*
Colorimeter, Recording (Cambridge Instrument Co., Ltd.), 54
Columbia Power Station, Data on, 299; Operating Results, 746*
Combined Stress. See under *Tests* (*Materials*)
Combustion of Carbon Monoxide, 589, 610
— Gaseous, at High Pressures (Review), 561
"Comet," S.S., History of, 334
Commerce and Industry, Association for Education in. See *Industry and Commerce*
— See *Trade*. See also *Industries and Commerce* in PARAGRAPH INDEX
Commercial Aviation. See *Aeronautics*
— Motor Cars. See *Motor*
Commission, Royal. See *Royal Commission*
Committee, Engineering Standards. See *Engineering* and *Standardisation*
Commonwealth. See *Australia*
Compani de Salitres y Ferrocaril de Junin, 300-h.p. Diesel Locomotive, 324*
Companies. See PARAGRAPH INDEX
Compass, Master, Holmes Magnetic (H. Hughes & Son, Ltd.), 130.
Compensation Water, Assessment of, 832
Compound Locomotives. See *Locomotives*
— Stress. See *Tests* (*Materials*)
Compounding in Aero Engines, 738. See LETTERS, 776, 838
Compressed-Air Cylinders, Welding of, 349, 353, 362*, 384, 386*, 394*, 427*
— — Discharge from Reservoirs, Theory of, 515
— — Society, British, Formation of, 550
— — Tools. See *Machine Tools*
— — See also *Pneumatic*
Compressor, Air. See *Air Compressor*
— Nitrogen and Ammonia, Coke-Oven Gas Decomposition Plant, 165*
Concrete Block and Slab Machine (Lee & Fouracre), 211
— Culverts, Portishead Power Station, 433*
— Core Wall, Impounding Dam, Welland Ship Canal Reconstruction, 791*
— Crib-Work Wharf, Harbour Works, Fort Churchill, Canada, 71
— Guns, Hetch Hetchy Water Supply, San Francisco, 126*
— Hardening in Sea Water, 67*
— Investigations by Building Research Board, 142
— Making, Basic Principles of (Review), 677
— Mixers (F. Parker, Ltd.), 226
— — "Transit" (British Steel Piling Co., Ltd.), 631*
— Monoliths, Welland Ship Canal Reconstruction, 242*
— Protection against Frost by Salts, 237
— Pump Casings, Medemblik Pumping Station, 656*
— Railway Sleepers, Use of, 659
— Reinforced. See *Ferro-Concrete*
— Silos (Taddel), 432
— Use in Railway Construction, 660
— See also *Ferro-Concrete* and PARAGRAPH INDEX
Condenser, 2,000-h.p. Krupp Turbine Locomotive, 280*
— Tubes, Leather Bullets for Cleaning, 718*
— — Naval, Materials for, 473, 486
— See also *Electric*
Condensing Plant, Barton Power Station Extension, Operating Results, 684*, 718*, 739, 746
Conductivity, Thermal, Refractory Bricks, 391
— See also *Electric*
Conduits, Ferro-Concrete, Medemblik Pumping Station, 656*
Conference (1929), Safety of Life at Sea, 485, 489*
— World Power. See *World Power Conference*
Congress for Applied Mechanics, Third International, Stockholm, 450
— Building, New York, Work of, 706
— Illumination, International, Great Britain, 1931, 143, 799
— International, Building and Public Works, London. See *Building and Public Works*
— — on General Mechanics, Liége, 1930, 143
— — History of Science and Technology, 568
— — Railway, Madrid. See *Railway Congress*
— World Engineering, in Japan. See *Engineering Congress*
— Zürich, 1931, New International Association for Testing Materials, 439
Connecticut Light & Power Co., Rocky River Hydro-Electric Development, 35*, 97*
Consolidated Pneumatic Tool Co., Ltd., Scaling Tools 63*. See *Erratum*, 79
Constructional Engineering Industry, Position and Prospects, 307
Contracts, Building, Standard Conditions, 707
Controllers, Electric Motor. See *Motors, Electric*
— Gas-Pressure, Automatic (G. Kent & Co. Ltd.), 841*
Convection Data and Heat Transmission, 742
Conversazione, Institution of Electrical Engineers, 825
— Royal Society, 643, 675, 823

Conveyor Belt Cleaner (Robins Conveying Belt Co.), 248*
— — Floating, Zuyder Zee Reclamation Works, 759*
— — Portable (Allgemeine Transportanlagen Gesellschaft), 473*; (Mavor & Coulson, Ltd.), 783*
— Potash Storage and Shipment Plant, Antwerp, 306*
Cooke, Troughton & Simms, Ltd., Nomograph for Surveyors, 315
Coolers, Gas, Becker Coke-Oven Plant, Sheffield, 699*
Coolidge Multiple-Dome Dam, Gila River, Arizona, 193*, 276*, 368*
Co-Operation. See *Labour*
Coping Guards, Lock Wall, Welland Ship Canal, 242*
Copper Alloys. See *Brass; Bronze; Gunmetal;* and *Alloys* under *Metallurgy*
— Conductors, Standard Specification, 671
— Cupped, X-Ray Studies of, 61
— Effect of Phosphorus on, 385, 522*. See *Erratum*, 436
— Imports of, 51
— Ingots, Soundness in, 384, 457*
— Large Single Crystal of, 823
— Locomotive Firebox, Properties of, 30
— Prices. See *Metal-Price Diagrams*
— Steam Pipe, Failure in S.S. "Rimutaka," 493
— Sulphide, Super-Conductivity of, 324
— Tubes, Hard-Drawn, Initial Stresses in, 65*
— Wire for Electrical Machinery, Standard Specification, 57
— Zinc Diffusion in, 398
— See also *Metallurgy*
Core Wall, Concrete, Impounding Dam, Welland Ship Canal Reconstruction, 791*
Cornish, R. J., on Test for Theodolite, 521
Corriveau, R. de B., on St. Hubert Airport, Montreal, 842*
Corrosion, Chemical, of Refractory Bricks, 391
— Effect on Strength of Lead, 309, 423*
— Iron and Steel, at Plymouth, Southampton and Weston-super-Mare, 544
— of Lead in Buildings, Report, 494
— in Naval Boilers and Condensers, 473*, 486
— Resistance, Chromium-Copper Steel, 642, 687
— Resisting Properties of Refractory Materials, 525
— — Steels for Ships, 263
— Sea Water, of Iron and Steel, 544
— Tests, Aluminium Brasses, 398, 554
— — Electro-Deposited Coatings, 389*, 398. See LETTER, 454
— of Zinc, Iron and Steel, 134
Counterweights, Lock Gate, Welland Ship Canal Reconstruction, 664*
Coverings, Non-Conducting. See *Heat Insulation*
Cracking, Season, and Initial Stresses in Hard-Drawn Tubes, 65*
Craggs-Plummer Adjustable Pit Prop, 212*
Crane, Cantilever, Shipyard, 5-Ton (J. Booth & Bros., Ltd.), 253*
— Creeper, 122-ton, Erection of Sydney Harbour Bridge, 495* 533*
— Dredging, Well Foundation, Godavery Bridge, India, 160*
— Electric, 25-ton, H.M. Fleet Repair Ship "Resource," 12*
— Grab, Floating, Zuyder Zee Reclamation Works, 759*
— Hooks, Factor of Safety for, 241
— Petrol-Electric Runabout (H. Morris, Ltd.), 208*
— Safe-Load Indicator for (Nash Safe-Load Indicators, Ltd.), 807*
— Travelling, Potash Storage and Shipment Plant, Antwerp, 366*
— Unloading, Potash Storage and Shipment Plant, Antwerp, 305*
Crankshafts, Torsional Vibration in Marine Diesel Engines, 529, 551*
Creaking in Passenger Ships, Causes of, 515. See LETTER, 572
Creep of Steel under Simple and Compound Stresses, 265*, 327*, 772*, 785*
Creeper Cranes, 122-ton, Erection of Sydney Harbour Bridge, 495*, 533*
Critical Points, Metals. See *Metallurgy*
— Speed of Shafting and Vibration in Ships, 529, 551*
Crompton, Col. R. E., Presentation of Address to, 825
Crompton Parkinson, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 87
Cross-Channel Steamers "Bessemer," "Castalia" and "Calais-Douvres," 96*
Crossley Brothers, Ltd., 220-h.p. Four-Cylinder Oil Engine, 203*
Crucibles for Nickel-Chromium Alloys, 781*
Crude Oil Engines. See *Engines, Oil*
Cruisers. See *Warships*
Crushing Machine, Single-Roll (British Jeffrey-Diamond, Ltd.), 811*
Crystal, Single, of Copper, 823
— Structure of Vitreous and Amorphous Bodies, 676
Crystalline Structure of Metals. See *Metallography; Microphotographs*
Culverts, Circulating-Water, Portishead Power Station, 433*
— Entrance Lock, Ymuiden, North Sea Canal, 6*
— Welland Ship Canal Reconstruction, 157*, 241*, 593*, 663*
Cunard Company, Early Fast Ships of, 693
Cunningham, Dr. B., on Entrance Lock of North Sea Canal to Amsterdam, 3*, 67*
Cupped Copper, X-Ray Studies of, 61
"Curacoa," S.S., Atlantic Voyages of, 691
Curtis Steam Traps (J. d'Este Co.), 250
Curved Beams, Plaster Models for Stress Determination in, 231
Cussons, G., Ltd., Model of Thermodynamic Surface of Nitrogen, 130
Cycle Industry, Position and Prospects, 114
— Motor. See *Motor Cycle*
Cyclic Temperature Controller and Recorder, (Drayton Regulator and Instrument Co., Ltd.), 214*
Cylinders, Thick-Walled, under High Pressure and Temperature, 772*, 785*, 818*
— Compressed-Air and Gas, Welding of, 349, 353, 362*, 382, 386*, 394*, 427*

D.

DALMARNOCK Substation, 60,000 kv.-a. Transformers, 600*
Dalrymple-Hay, H. H., Circulating-Water Culverts, Portishead Power Station, 433*
Dam, Arch, Dordogne River, Marège, France, 578
— — Laminated, with Forked Abutments, 578
— Assouan, Sluice-Discharge Measurements, 23; Heightening of, 101*
— Concrete Wall, Rocky River Hydro-Electric Development, 37*
— Coolidge Multiple-Dome, Gila River, Arizona, 193*, 276*, 368*
— Earth-Fill, Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— — Fill, Rocky River Hydro-Electric Development, 37*
— Eildon, Failure of, 134
— Enclosing, Medemblik Pumping Station, Zuyder Zee Reclamation Works, 655*
— Impounding, Welland Ship Canal Reconstruction, 791*
— Masonry, Hydrostatic Uplift under, 181*, 235*
— Reservoirs (Safety Provisions) Bill, Objections to, 516
— Safety and Watertightness of, 267. See *Erratum*, 411
— Zuyder Zee Reclamation Works, 655*, 761
Daniel, A. J., on Safety of Life at Sea (1929 Conference), 489*. See 485
Daniels, E. J., on Unsoundness in Bronze Castings, 358*. See 353, 384
Dauzere, M. C., on Lightning and Power-Transmission Lines, 93
Davey, Paxman & Co., Ltd., All-Steel Sectional Hot-Water Boiler, 206
Davidson & Co., Ltd., Exhibits at British Industries Fair, 211
Davies, A., on Co-Ordination of Transport, 82
Davies, D. T., on Coal Cleaning, 449
Davies, L., on Protective Value of Some Electro-Deposited Coatings, 389*, 398. See LETTER, 454
Davit, Gravity, and Winch (S. Taylor & Sons (Brierley Hill), Ltd.), 668*
"Daylight Factor" in Illumination of Buildings, 550.
d'Este, J., Co., Curtis Steam Traps, 250
d'Eyncourt, Sir E. T., Work of, 35
De-Aerator for Domestic Water Supply (Cochrane Corporation), 120*
De Haukes Harbour, Zuyder Zee Reclamation Works, 762*
Deflectograph, Universal (Cambridge Instrument Co., Ltd.), 52*
Dehydration of Town Gas, 742
Deion Circuit Breaker (Westinghouse Electric and Manufacturing Co.), 152,* 174
Delanoë, F., Flax-Pulling Machine, 431
Den Oever Pumping Station, Zuyder Zee Reclamation Works, 655*, 759*
Depth Gauges for Liquids (Liquidometer Co., Inc.), 74*
Derrick, Tilting, Godavery Bridge Construction, India, 161*
— See also *Cranes*
Derwent Valley Water Board, Diversion of River Ashop, 301
Deschamps, J., Gilled Tubes for Boiler Combustion Chambers, 421*
Destroyers. See *Warships*
Detonation in Petrol Engines, Bouncing-Pin Apparatus, 44*
Deutz Motorenfabrik, A.-G., High-Speed Oil Engines, 409*
Deviation of Oil Wells, Prevention and Correction, 699
Diagrams, Indicator. See *Indicator*
— Metal-Price. See *Metal-Price Diagrams*
"Diane," French Submarine, Launch, 671
Dichlorofluoromethane as a Refrigerant, 776
Dicol Heavy-Oil Burner, 300*
Die-Casting Alloys, Zinc-Base, Properties of, 399, 429*. See LETTER, 517
Dies, Wire-Drawing (F. J. Witts & Co.), 130
Diesel Engine Users' Association, High-Speed Diesel Engine, by H. R. Ricardo, 607
— — See *Engines, Oil, Diesel; Marine Propulsion*
Dinnen, J., Writings on Marine Boilers, 499
Direction Finding, Radiotelegraphic. See *Telegraphy, Wireless*
Directories. See LITERATURE INDEX
Discharge Coefficients, Flow from Nozzles, 803
Dished-End Drums, Fusion-Welded, Strength of, 394
— — Drums, Stresses in, 190*. See LETTER, 517
Diskus-Werke A.-G., 78-in. Hydraulic Face-Grinding Machine, 72*
Dispersers, Hydraulic Jet, Arapuni Hydro-Electric Scheme, 137*
Disputes, Trade. See *Labour*
Disrupted Strata (Review), 817
Distilling Apparatus (Reyles, Ltd.), 216*
Diving, Physiological Aspects of, 259
Dixon, W., the Late, 147
Docherty, J. G., on Thickness of Boiler Tubes, 527* See LETTERS, 632*, 679, 711, 776
Dock, Barge, Sydney Harbour Bridge, 534*
— Floating, for River Ganges, India, 13
— — for Walsh Island Dockyard, New South Wales, 283*. See *Addendum*, 410
— South Wales, Great Western Railway, Developments, 385
— Southampton, Extension, 573
Dockyard, Walsh Island, New South Wales, Floating Dock for, 283*. See *Addendum*, 410
Doehler Die Casting Co., Zinc Gear Wheels, 122
Doler Zinc (Doehler Die Casting Corporation), 122
Dollé, Motor-Driven Mowing Machine, 431
Domestic Electric Power Supply, 804
Dominion Machinery Co., Ltd., Electrically-Driven Universal Woodworker, 210*; 26-in. Saw Bench, 211*
Dondona, Lieut.-Col. F., on Sea Trials of Flotilla Leaders, 530. See 568
Doors, Culvert, Portishead Power Station, 436*
— Lifting Machine, Becker Coke-Oven Plant, Sheffield, 699*
Dordogne River, Marège Arch Dam, 578
Dorman, Long & Co., Ltd., Sydney Harbour Bridge, Erection of Main Span, 495*, 533*
Dorman, W. H., & Co., Ltd., 61-b.h.p. Petrol Engine and Locomotive, 504*
Dortmund, Mont Cenis Colliery, Linde Plant for Coke-Oven Gas Decomposition, 163*
Drain, Catchwater, Zuyder Zee Reclamation Works, 761*
Drainage Wells, Foundation, Ymuiden Entrance Lock, North Sea Canal, 4*
— Work, Gas-Displacement Pump for, 743
Drawing, Engineering, Theory and Application (Review), 39
— Machine, Leaky-Harper (Cambridge Instrument Co., Ltd.), 644
— — for Timber Investigation, 644
Drayton Regulator and Instrument Co., Ltd. Exhibits at Physical and Optical Societies' Exhibition, 88; Automatic Temperature or Pressure Regulating Apparatus, 136*; Cyclic Temperature Controller and Recorder, 214*
Dredging Crane, Well Foundation, Godavery Bridge, India, 160*
Dressings, Mould, Effect on Cast Alloys, 357*, 384
Driers, Sulphate, Becker Coke-Oven Plant, Sheffield, 699*
Drills and Drilling Machines. See *Machine Tools*
Drilling, Oil Well, Prevention of Deviation, 699
Drums, Dished End, Fusion-Welded, Strength of, 394*. See 190*, 517
— Steam and Water, for 600-lb. Pressure Yarrow Boilers, 406*. See 416
— — and Water, Strength of Dished Ends, 190*. See LETTER, 517. See also 394
Dry Dock. See *Dock*
Drying of Town Gas, 742
Dubert & Serre, Maize-Stripping Machine, 431
Dublin Summer Meeting, Institution of Electrical Engineers. See *Electrical Engineers, Institution of*
Duddell Scholarship, 680
Duisburg, Hydrogen Plant for Coal Liquefaction, 165*
Dumping Grate for Boiler Furnaces (Neemes Foundry, Inc.), 122
"Dunbar Castle," M.S., 697*
Dunston Power Station, Low-Temperature Distillation at, 184
Durham, F. E. F., on Pumping Machinery for Water-Works, 809*, 839. See 710
Durham Bursary, 604
Düsseldorf Meeting, Institute of Metals. See *Metals, Institute of*
Dust, Asbestos, Effect on Lungs, Report, 577
— Coal, Relative Inflammability of, Report, 536
— — See also *Pulverised Coal*
— Removal from Flue Gases, 741. See 248
— Trap, Boiler Flue (Green Fuel Economiser Co.), 248
Dutch Power Station Practice, 267
Dynamometer, Transmission, Simple Form, 621*. See LETTERS, 743, 776
— Electrical (Highfield Electrical Co., Ltd.), 438*. See 226
Dynamos. See *Generators, Electric; Turbo-Generators*

E.

EARTH-FILL Dam, Rocky River Hydro-Electric Development, 37*
— Pressure, Experiments on, 689*, 753*
East Africa, Economic Conditions in, Report, 512
— England Electricity Scheme, 667*
— Indian State Railway, Re-Girdering of Lower Sone Bridge, 562*. See *Erratum*, 697
— River Power Station, New York, Water-Tube Boiler, Record Performance, 137
Eccles, Dr. W. H., on Physical Research in Wireless, 805
Echo-Sounding Equipment, Marine, 129
Economic Development of Empire Markets, 415
Economics, Industrial. See also *Labour*
— Railway. See *Railway*
Economisers for 600-lb. Pressure Yarrow Boilers, 406*. See 416
— for "Wood" Steam Generator, 143, 149*, 177. See LETTER, 263
Edenholm, H., on Tests of Ljungström Air-Preheaters, 155
Edinburgh Corporation, Extension of Portobello Power Station, 715
Ediplate Corporation, Seamless Float, 249*
Edmunds, G., on X-Ray Studies of Cupped Copper, 61*

Education :

Board of Education, National Certificates in Building Technology, 88
Builders, Institute of, National Certificates in Building Technology, 88
Building and Public Works, International Congress, Discussion on Apprenticeship, Education and Training, 707
Chelsea Polytechnic, Demonstrations in Photomicrography, 487
Electrical Engineers, Institution of, Duddell and Ferranti Scholarships, 680
Engineering Training for Officers' Rank, 448
Faraday House, Faraday and Maxwell Scholarships, 200; Entrance Scholarships, 568
Fuel, Institute of, Annual Prize Essay, 148
Industry and Commerce, Association for Education in, Annual Report, 772
Junior Institution of Engineers, Durham Bursary, 604

Education—*continued.*

Kenrick Technical College, Engineering Shop and Foundry, 60*
King's College, London, Department of Mechanical Engineering, Lectures on Engines for Aircraft, 254
Leicester College of Technology, Industrial and Commercial Administration Course, 800
London County Council School of Engineering and Navigation, Lectures on High-Tension Electricity, 148
— School of Hygiene and Tropical Medicine, Lectures on Health in the Tropics, 321
— University College (1826-1926) (Review), 98
— — College, Goldsmid Engineering Scholarship, 88
Manchester Municipal College of Technology, Research Scholarships, 572; Summer Courses, 680
Marine Engineering, Scarcity of Students of, 482
National Union of Students, Appeal for Funds, 411
Naval Architecture, Scarcity of Students of, 482
North-East Coast Institution of Engineers and Shipbuilders, Report, Engineering Training for Officers' Rank, 448
Patentees, Institute of, Scholarship, 387
Poplar School of Engineering and Navigation. Lectures on High-Tension Electricity, 148
Rensselaer Polytechnic Institute, Prospectus, 734
Royal Institute of British Architects, Scholarship, 734
— Sanitary Institute, Henry Saxon Snell Prize, 88
— Society of Arts, Thomas Gray Prizes in Science of Navigation, 454
Salford Royal Technical College, John Morris Memorial Prize, 170
Scholarship, Science, Engineering and Metallurgy, Institute of Patentees, 387
— — Syllabus, 800
Structural Engineers, Institution of, Brenforce Travelling Scholarship, 604
Technical Education of Engineers, 34
University College, London (1826-1926) (Review), 98
— — London, Goldsmid Engineering Scholarship, 88
Welding Operatives, Training of, 349, 387
West Bromwich, Kenrick Technical College, Engineering Shop and Foundry, 60*
Whitworth Scholarships, Regulations, 734
Women's Engineering Society, Pamphlet on Training Women as Engineers, 504
See also PARAGRAPH INDEX
Edward Valve & Manufacturing Co., 7-in., 1,350-lb. Pressure Stop Valve, 249*
Edwards, W., & Co., Gaede Vacuum Pump, 130
Efficiency of Boiler Plants. See *Boiler Plants*
— of Engines. See *Engines; Trials*
Egypt, Assouan Dam, Sluice-Discharge Measurements, 23; Heightening of, 101*
— River Nile, Nag Hamadi Barrage, Construction Cableway, 252
Egyptian Implements, Ancient, Metallography of, 641
— State Railways, Articulated Steam Rail Coaches, 715*
Eildon Dam, Failure of, 134
Einstein, Prof. A., on Physical Space and the Ether Problems, 805
Elam, Dr. C. F., on the Diffusion of Zinc in Copper, 398
Ellrich, W., on Town Heating in Germany, 185

Electric :

Alternator. See *Generator* and *Turbo*
Aluminium Conductors, Standard Specification, 445
Ammeters, Micro- (Cambridge Instrument Co., Ltd.), 54*
Arc Furnace. See *Furnace, Electric*
— Welding. See *Welding*
Arrester, Mercury, High-Voltage, 92, 93
Cable-Connecting Box for Mines (G. Ellison, Ltd.), 223*
— Control (Bishop Wire & Cable Co.), 248
— High-Voltage, Design and Operation (Review), 100
— Investigations on Lead for Sheathing, 399, 423*
— Tunnel under River Hooghly, 124
Canadian Electrical Code, 449
Central Electricity Board, Report, 481; East England Electricity Scheme, 667*
— Stations. See *Power Stations*
Condenser, Air, and Transformers for 1,000,000-volt Testing Set (Metropolitan-Vickers Electrical Co., Ltd.), 312*
— Synchronous, Hydrogen-Cooled (General Electric Co.), 534*
Conductivity of Copper, 523*
— of Copper Sulphide, 324
Conductors, Aluminium, Standard Specification, 445
— Copper, Southern Ireland Electricity Scheme, 732
— — Standard Specification, 671
— Steel-Core, Aluminium, Central Scotland Electricity Scheme, 603*
Control System for Ships' Windlasses, 483
Copper Sulphide, Super-Conductivity, 324
Crafts and Industry, Power Supply in, 833
Cranes. See *Cranes*
Current Tariffs and Load Models, 835
Dessauer Circuit, 1,000,000-volt Testing Set, 312*
Dynamo. See *Generator; Turbo-Generator*
Electrical Appliances, Testing in Canada, 669
— Communication, Pioneers of (Review), 817
— Development Association, British, Work of, 544
— Engineering, Progress in United States, 55

Electric—*continued.*
Electrical Equipments, Explosion-Proof, Abnormal Pressures in, 477
— Exhibits at Leipzig Fair, 340
— Industry, Position and Prospects, 51
— Machinery, Imports and Exports, 51, 777*
— Technology, Text Book of (Review), 677
— — Worked Examples in (Review), 562
Electricity Board, Central, North-East England Scheme, Frequency Standardisation, Cost, 143; Central Scotland Electricity Scheme, 599*
— Commissioners, Annual Report, 18; Bedford Rural Electricity Scheme, 355*; Memoranda on Rural Electrification, 548; Promotion of Voltage Standardisation, 511; South-West England and South Wales Electricity Scheme, 119*
— Committees and Municipal Electrical Undertakings, 698
— Supply Board, Southern Ireland, Electricity Scheme, 731*, 743, 771. See *Erratum*, 767
Electroplating. See *Electro*
Electrotechnical Commission, International, Scandinavian Meeting, 484
Frequency Meter, Warren Master, 86
— Recorder (Instrumenti di Misura C.G.S.), 87
— Standardisation, North-East England Electricity Scheme, Government Assistance for, 143
Furnaces. See *Furnaces*
Generating Stations. See *Power Stations*
Generator. See *Generator* and *Turbo*
Heat-Storage System, Electric-Oil (Browns Dryers, Ltd.), 493
Heating, Electric, of Buildings, 741
— — Progress of, 834
— Elements, Pyromic, 219
— — Thermal-Storage Plant (A. Reyrolle & Co., Ltd.), 94*
High-Tension Electricity, Lectures on, 148
Hydro-Electric Power Plants. See *Power Plants*
Hydrogen-Cooled Synchronous Condenser, 534*
Induction Furnace. See *Furnace*
— Motors. See *Motors, Electric*
Inductive Interference from Power Transmission Lines, 93, 351
Insulators, Porcelain and Steatite, Manufacture of, 632
— Transmission Line, Southern Ireland Electricity Scheme, 732*
Inverter, Mercury, 92
Lightning, Artificial, Testing Equipment (Ohio Insulator Co.), 455*
— and Power-Transmission Lines, 93
Load Models and Current Tariffs, 835
Locomotives. See *Locomotives, Electric*
Machines. See *Generators; Motors*
Mains. See *Cables* (above).
Mercury Arrester, High-Voltage, 93
— Inverter, 92
Meters, Electricity, Standard Specification, 812
— Microvolt-Hour, 675
Motors. See *Motors, Electric*
Mutual Inductometer (Cambridge Instrument Co., Ltd.), 53*
Oil Switch. See *Switchgear*
Plugs and Sockets, Standard Specification, 752
Power Stations. See *Power Stations*
— See *Power*
Railways. See *Railways*
Research Laboratory, High-Voltage (Metropolitan-Vickers Electrical Co., Ltd.), 312*
Resistance Welding. See *Welding*
Resistivity of Copper, 523*
Resistor for Electric Furnace, 676
Rolling Mills, Electric Driving of. See *Rolling Mills*
Röntgen Rays. See *Röntgen*
Ship Propulsion. See *Marine Propulsion*
Sockets and Plugs, Standard Specification, 752
Starters, Motor. See *Motors, Electric*
Steel Manufacture. See *Metallurgy*, and *Furnace, Electric*
Street Railways. See *Tramways*
Substation. See *Substation*
Switchgear. See *Switchgear; Motors, Electric*
Synchronous Condenser, Hydrogen-Cooled (General Electric Co.), 534*
Tariffs, Current, and Three-Dimensional Load Models, 835
Telegraphy. See *Telegraphy*
Telephony. See *Telephony*
Testing Equipment, High-Voltage, 455*
Thermo-Junction, Vacuo (Cambridge Instrument Co., Ltd.), 54
Thermometer. See *Thermometer*
Thundercloud, Electric Field Produced by, 669
Traction. See *Locomotives, Electric; Railways; Tramways*
Tramways. See *Tramways*
Transformers. See *Transformers*
Trolley Wires, Use in Mines, Regulations, 380
Turbo-Generators. See *Turbo-Generators*
Voltages, High, Use in United States, 55
— Standardisation, Need and Cost of, 511
Ward-Leonard System, Winch Control, 483
Wavemeter, Sub-Standard (H. W. Sullivan, Ltd.), 7*
Welding. See *Welding*
Winches, Electro-Hydraulic, St. Hubert Airport, Montreal, 844
Wireless Telegraphy. See *Telegraphy*
— Telephony. See *Telephony*
Wiring Rules Committee, Australian, 507
X-Rays. See *Rontgen Rays*
See also PARAGRAPH INDEX
Electric Furnace Co., Ltd., Ajax-Northrup Furnace, 219
Electrical Development Association, British, Work of, 544
Electrical Engineering, Progress in the United States, 55

Electrical Engineers, Institution of:
Election of Sir R. T. Glazebrook as Honorary Member, 88
Faraday Medal, Award to Sir E. Rutherford, 139, 595
Breaking Performance of High-Power Switchgear and a New Form of Quenched-Arc Switch, by L. C. Grant, 173
Annual Dinner, 230
Imperial Chemical Industries, Ltd., Steam and Electric Power Plant at Billingham, by H. A. Humphrey, D. M. Buist and J. W. Bansall, 350
Report on Standardisation of Distribution Voltages, 511
Kelvin Lecture on Theory of Metals, by R. H. Fowler, 595
Duddell and Ferranti Scholarships, 680
Summer Meeting, Dublin, Visits and Excursions, 743, 771
Conversazione, 825
Presentation of Address to Col. R. E. Crompton, 825
Faraday Centenary Celebration, 1931, Programme, 832
Western Centre:
Annual Dinner, 79
Electrical Machinery, British Exports, 777*
Electrical Power Engineering Co. (Birmingham), Ltd., 30-h.p. Motor-Generator Electroplating Set, 224*
— Technology, Text Book of (Review), 677
Electricity Commissioners. See under *Electric*
Electro-Chemical Industries, Power Supply in, 833
— Deposited Coatings, Protective Value of, 389*, 398. See LETTER, 454
Electrolytic Corrosion. See *Corrosion*
Electron Theory of Metals, 595
Electroplating, Chromium, 94*
— Nickel, Stopping-Off Materials for, 536
Electrotechnical Commission, International, Scandinavian Meeting, 484
Elliott Brothers (London), Ltd., Exhibits at Physical and Optical Societies' Exhibition, 87
Ellison, G., Ltd., 11,000-volt Cubicle-Type Switchgear, 222*; Cable-Connecting Box for Mines, 223*; Circuit Breaker for Colliery Gate Ends, 223*
Ellson, G., Folkestone Harbour Swing Bridge, 645*
Embankments, Welland Ship Canal Reconstruction, 725*
— Zuyder Zee Reclamation Works, 655*, 759*, 821*
Emery Wheels. See *Grinding* under *Machine Tools*
Empire, British, Engineering Exports to, 777*
— Hall, Olympia, 166
— Markets, British Share in, 415
— Trade and Canadian Budget, 632. See *Erratum*, 683
Employees. See *Labour*
Employment. See *Labour*
"Empress of Britain," S.S., Launch, 773
Emrich, J., G.m.b.H., Shaping Machine, 309*
Encyclopædia Britannica, Authorship of Article on Tides, 234, 263
Endurance Tests. See *Alternating Stress* under *Tests (Materials)*
Engineering and Allied Industries, Position and Prospects, 20, 51, 82, 114, 145, 176, 229, 260, 289, 307
— Apprentices. See *Apprenticeship; Education*

Engineering Congress in Japan:
Visits and Excursions, 18
Economics of Water *versus* Steam Power, by G. A. Orrok, 122
Hydrostatic Uplift under Masonry Dams, by H. de B. Parsons, 181*, 235*
Publication of Proceedings, 828
Engineering Drawing, Theory and Application (Review), 39
— Education. See *Education*
— Electrical, Progress in the United States, 55
— Exports, British, Statistics, 777*
— Geology (Review), 162
— Hydraulic, Problems in (Review), 817
— Institute of Canada. See *Canada*
— Laboratories. See *Laboratories; National Physical*
— Marine, Scarcity of Students in, 482
— Markets of the World, 777*
— Museum, Proposed, at Newcastle-on-Tyne, 261
— Shop and Foundry, Kenrick Technical College, West Bromwich, 60*
— Societies. See *Institutions*
— Standards Association, British, Dinner, 351; Specification, Switches and Circuit Breakers, 54; Specification, Copper Wire for Electrical Machinery, 57; Specification, Tests for Timbers, 63; Specification, Road Tar, 71; Specification, Alternating-Current Switchgear, 321; Specification, Aluminium Conductors, 445; Specification, Vandyke Brown, 509; Specification, Copper Conductors, 671; Standard Railway Signalling Symbols, 734; Specification, Plugs and Sockets, 752; Specification, Flame-Proof Switches, 799; Specification, Electricity Meters, 812
— — Association, Canadian, Specification, Steel Bars and Billets, 252; Electrical Code, 449; Specification, Steel Structures for Buildings, 811
— Training for Officers' Rank, Report, 448
— Wages in Germany, 146, 455
— Work, Difficulties in, 238
— — See *Works*
Engineers in Canada, Registration of, 768
— in-Charge, Institution of, Dinner, 525
— Education. See *Education*
— Institutions. See *Institutions*
— Marine, Co-Operation with Naval Architects, 482
— — Early, 498
Engineers and Shipbuilders in Scotland, Institution of, Annual Report, 254
Engines, Aero. See *Aeronautics*
— Diesel. See *Engines, Oil, Diesel; Marine Propulsion; Motor Ships*
— Heat, Work of Prof. A. Stodola, 38
— Internal-Combustion, Electrical Dynamometers for Testing, 438*. See 226
— — Combustion, Theory of (Review), 806
— — Combustion, on United States Railways, 117
— Locomotive. See *Locomotive*
— Motor-Car. See *Engines, Petrol*
— Oil, Aeroplane, Six-Cylinder (Junkers-motorenbau G.m.b.H.), 471*
— — Beardmore Tornado Eight-Cylinder, Airship "R.101," 271
— — Diesel, 70-h.p., Four-Cylinder McLaren-Benz, for 7-ton Lorry, 169*
— — Diesel, for 7,500-kw. Generators, Hennigsdorf Substation, Berlin, 411
— — Diesel, 400-b.h.p., Leemans Pumping Station, 761*
— — Diesel, Marine, 2,750-h.p., with Büchi Supercharger, Trials (North Eastern Marine Engineering Co., Ltd.), 280*. See LETTERS, 323, 448
— — Diesel, Marine, Developments in, 185, 835
— — Diesel, Marine, 735-h.p., Eight-Cylinder, M.S. "Grainmotor," 124
— — Diesel, Marine, 50,000-h.p., German Battleship "Ersatz Preussen," 175*
— — Diesel, Marine, 20,000-s.h.p. Harland-B. & W. Type, M.S. "Britannic," 836*
— — Diesel, Marine, 5,200-h.p. Harland B. & W. Type, with Büchi Supercharger M.S. "Dunbar Castle," 697
— — Diesel, Marine, 400-b.h.p. Six-Cylinder, Carels-Ingersoll Rand Type, 106*
— — Diesel, Marine, Vibration of, 529, 551*
— — Diesel, Progress in Germany, 185
— — Diesel, Progress in Japan, 186
— — Diesel, Ricardo-Brotherhood Type, 607
— — Diesel, 200-h.p., Six-Cylinder, for Rail-Car (F.I.A.T. Co.), 7*. See 186, 624
— — Diesel, Use in Canada, 124
— — Diesel. See also *Motor Ships; Marine Propulsion; Diesel Engine Users' Association*
— — 65-h.p. to 750-h.p., with Electric Generators (W. H. Allen, Sons & Co., Ltd.), 206
— — 220-h.p., Four-Cylinder (Crossley Bros., Ltd.), 203*
— — with Generator and Air Compressor, (Norris, Henty and Gardners, Ltd.), 204*
— — Heavy, at British Industries Fair, Birmingham, 206
— — Heavy, at Leipzig Fair, 340
— — High-Speed, 40-h.p., Four-Cylinder and 60-h.p., Six-Cylinder Airless-Injection (Motorenfabrik Deutz A.-G.), 409*
— — High-Speed, Design of, 607
— — Horizontal, with Spring-Injection (Blackstone & Co., Ltd.), 206
— — for Locomotives, 376*, 623. See 110
— — Marine, Semi-Diesel, 200-h.p., and 100-h.p., British Kromhout, for Motor Tugs, 178
— — Naval, Materials used in 475, 486
— — Railway Traction by, 110. See 376*, 623
— — 300-h.p., Six-Cylinder Airless-Injection, McLaren-Benz, for Locomotive, 324*
— — 195-h.p., Three-Cylinder Two-Stroke (Petters, Ltd.), 205*
— — Vertical, Two-Stroke (Tangyes, Ltd.), 204*
— — for Water Works, Economics of, 809*, 839
— — See also *Tractors* and PARAGRAPH INDEX
— Petrol, Aeroplane. See *Aeronautics*
— — Detonation in, Bouncing-Pin Apparatus, 44*
— — Marine, 75-b.h.p., Six-Cylinder, Endurance Test (J. I. Thornycroft & Co., Ltd.), 56
— — Motor-Car, Electrical Dynamometers for Testing, 438*. See 226
— — Motor-Car, Influence of Taxation on Design, 303*, 366. See LETTERS, 776, 808
— — Motor-Car, Stroke-Bore Ratio, 303, 366
— — and Paraffin, Cylinder Compression Ring for (Petters, Ltd.), 205*
— — Single-Cylinder, for Variable-Compression Fuel-Research Set, 44*
— — 61-b.h.p., Six-Cylinder, for Locomotive (W. H. Dorman & Co., Ltd.), 504*
— — Supercharging and Compounding, 738. See LETTERS, 776, 838
— — ½-h.p., and 1-h.p., Two-Stroke, with Lighting Generators (R. A. Lister & Co., Ltd.), 204*
— — See also *Aeronautics; Motor Cars*
— Room Telegraph, Electrically-Operated (Hopkinsons, Ltd.), 392*
— Steam, High-Speed, with Expansion and Compression Governor (W. Sisson & Co., Ltd.), 570*, 813*
— — Marine, History of, 333, 498, 690
— — Marine, Progress with, 835
— — Marine. See also *Marine Propulsion; Turbines*
— — Theory of (Review), 806
— — for Water Works, Economics of, 809*, 839
— — Three-Cylinder, for Rail Coach (Yorkshire Patent Steam Wagon Co.), 716*
— See also PARAGRAPH INDEX
English Electric Co., Ltd., Transformers, Central Scotland Electricity Scheme, 600*
— Instrument Makers of the Eighteenth Century, 772
"Enterprise," S.S., History of, 498
Entropy Diagram for Water, 2. See 88*
Equilibrium Diagrams, Alloys.* See *Metallurgy*
Erecting and Handling Gear, Godavery River Bridge, India, 160*
Erie City Iron Works, Carbofrax Firebricks for Boiler Furnaces, 248
"Ersatz Preussen," German Battleship, 175*
Escher, Wyss & Co., Researches on Hydraulic Turbines, 267; 2,000-h.p., Zoelly Geared Turbine for Krupp Locomotive, 280*
Est Railway, 4-8-2 Type Express Locomotive, 334*
Estrado Electric Ploughing Tackle, 431
Etalon, Fabry-Pérot (A. Hilger, Ltd.), 675
Ether Problems and Physical Space, 805
Eutectic Alloys. See *Alloys* under *Metallurgy*
— Composition of, 383
Evaporator with Continuous-Cleaning Mechanism (Clarke, Chapman & Co., Ltd.), 774*
Everall, W. T., on Reconstruction of Attock Bridge, North Western Railway, India, 503
Everett, Edgcumbe & Co., Ltd., Exhibits at Physical and Optical Societies' Exhibition, 86*
Evers, G. V., on Manufacture of Refractory Materials in America, 525
Eversheds & Vignolles, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 129
Exhaust-Steam Turbine. See *Turbine, Steam*
Exhauster, Gas, for Sewers (Siemens-Schuckertwerke A.-G.), 376*
Exhibition, Agricultural Machinery, Paris, 431
— Belgian International, Liége and Antwerp, 548. See 829
— British Empire Trade, Buenos Aires, 71, 448, 509
— — Industries Fair, Birmingham, 203*, 227, 261. See 295*, 438*, 605
— — Industries Fair, Development Committee, 605
— Engineering, Institution of Civil Engineers Conversazione, 772
— Leipzig Fair, Technical Exhibits, 309*, 340*, 373*
— Machine Tool, 1932, 609
— North-East Coast, Newcastle-upon-Tyne, Disposal of Buildings, 201
— Power and Mechanical Engineering, New York, 55, 74*, 120*, 247*. See *Erratum*, 567
— Scientific Apparatus, Physical and Optica Societies', 52*, 86*, 128*, 323, 343
— — Apparatus, Royal Society Conversazione, 643, 675, 823
— Swedish Industries Fair, Gothenburg, 509
— See also PARAGRAPH INDEX
Expansion Joints, 'Monolith, Welland Ship Canal, 243*
— of Steam Pipes, 579, 587
Experimental Engine. See *Engine*
— Tank. See *Tank; Ship Resistance*
Explosion, Boiler. See *Boiler Explosion*
Explosives, Enlarging Borehole by, 298*
Export Trade. See *Trade;* and *Industries* in PARAGRAPH INDEX
Extensometer, Huggenberger, 502*
— Lateral, 465*

F.

FABRY-PÉROT Etalon (A. Hilger, Ltd.), 675
Factories, Asbestos Dust in, Home Office Report, 577
— Production and Distribution of Steam in, 585*, 579, 618*, 650*
Factory Accidents. See *Accidents*
— Management. See *Works Management*
Falling Bodies, Timing Apparatus for (Griffin & Tatlock, Ltd.), 87
Fan, Exhaust, for Pulverised-Fuel Separation, 826*
Faraday Centenary Celebrations, 1931, Programme, 832
— House, Faraday and Maxwell Scholarships, 200; Entrance Scholarships, 568
— Medal, Award to Sir E. Rutherford, 139, 595
— Society, Stopping-Off Materials for Nickel Plating, by D. J. MacNaughtan and A. W. Hothersall, 536
Farming. See *Agriculture; Tractors*
Fatigue Tests of Metals. See *Alternating Stress* under *Tests (Materials)*
Feed-Distributing System, S.S. "Statendam," 491*, 513
— Heating System, Barton Power Station Extension, 684*, 739, 746
— Pumps. See *Pumps*
— Water Arrangements, "Wood" Steam Generator, 150*
— — Heaters (Gresham & Craven, Ltd.), 212*
— — Heaters, Use in Locomotives, 626
— — Softening. See *Water Softening*
— — Treatment, Barton Power Station, 597, 739, 746
— — See also *Water*
Feeder, Chain, for Materials (Ross Patents, Ltd.), 211
— Coal, Revolving-Table, Becker Coke-Oven Plant, Sheffield, 699*
— Railways, 662
Felten & Guilleaume Carlswerk A.-G., Ironclad Switchgear, 373*
Fenders, Timber, Welland Ship Canal Reconstruction, 337*
— Wire Rope, Welland Ship Canal Locks, 157
Ferranti, Dr. S. Z. de, the Late, 84*
Ferranti, Ltd., 30,000kv.-a. Transformers, Central Scotland Electricity Scheme, 600*
— Scholarship, 680
Ferries, Train, Japanese Government Railways, 117
Ferro-Concrete Bridge, Beams for, 591*
— — Conduits, Medemblik Pumping Station, 656*
— — Core Wall, Mocassin Creek Dam, Hetch Hetchy Water Supply, San Francisco, 125*
— — Elevated Water Reservoir, Sydney, 137
— — Gate Tower, Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— — Locks, Zuyder Zee Reclamation Works, 762*, 821*
— — Multiple-Dome Dam, Arizona, 193*, 276*, 368*
— — Pile Foundations, Entrance Lock, Ymuiden, North Sea Canal, 6*
— — Railway Sleepers, Use of, 659
— — Tee Beams, Design of, 591*
— — Towers, Den Oever Sluice System, Zuyder Zee Reclamation Works, 821*
— — Use in Railway Construction, 660

Ferro-Concrete Wall Construction, Entrance Lock, Ymuiden, North Sea Canal, 6*
— — Wall Construction, Welland Ship Canal Reconstruction, 243*
— — See also PARAGRAPH INDEX
F.I.A.T. Company, Oil-Driven Rail-Car with Electric Transmission, 7*. See 186*, 624
Field, M. B., the Late, 346
Fielding & Platt, Ltd., Exhibits at British Industries Fair, 206
Fifteen-Mile Falls Power Scheme, Retaining Wall, 689*
Films, Talking, Optical Apparatus for Production, 823
Filter Press for Porcelain Insulator Manufacture, 633*
Financial Facilities for Building, 706
Finney, G., & Co., Exhibits at British Industries Fair, 208
Fire Extinguishers, Brentford Works, Pyrene Co., Ltd., 703
— in Steamship Bunker and Cargo Coal, Report, 463
Firebox Stays and Plates, Locomotive Boiler, Investigations, 30
Firebricks, Carbofrax, for Boiler Furnaces, 248
— Manufacture in America, 525
— for Naval Boilers, 473, 486
— See also *Refractory Materials*
Fireclay Bricks, Composition and Properties of, 392
— Softening and Melting Points of, 390
Firth, T., & Sons, Steel Castings for Variable-Density Wind Tunnel, 808*
Fishenden, Dr. M., on Heat Transmission and Convection Data, 742
Fitch, J., Work of, 333
Flamm, Prof. O., on Design of Submarines, 484. See LETTERS, 776, 484
Flange Lubricator for Railway Wheels (Hasler Telegraph Works), 538*
— Pipe, Fusion-Welded, 386*, 396*
Flatt, F., on Zoelly Steam Turbines, 267
Flax-Pulling Machine (F. Delanoë), 431
— Spinning Mills, York Street, Belfast, Electrification of, 795*
Fleet. See *Warships*
Fleming, R., A Skyscraper Survey, 581
Fleming, Sir J. A., on Television, 343
Flexible Pipe Joints (Barco Manufacturing Co.), 250
Float, Seamless (Ediplate Corporation), 249*
Floating Dock. See *Dock*
Floods, Thames, Prevention, London County Council Report, 382
Flotilla Leaders. See *Warships*
Flues, Boiler, Dust and Cinder Trap for (Green Fuel Economiser Co.), 248
— Gases, Dust Removal from, 741
Fluids, Flow of, Mean Speed of Discharge, 803
— Friction in Steam Pipes, 579, 587
Fluid Presses, Ltd., Hydraulic Press with Flexible Platen, 630*. See LETTER, 679. See *Addendum*, 703
Fluidity of Clay, 134
"Folkestone," H.M. Sloop, Launch, 250
— Harbour, Replacement of Swing Bridge, 645*
Ford, G. W., on Effect of Phosphorus on Copper, 522*. See 385. See *Erratum*, 436
Forest Products Research Board, Report on Home-Grown Timbers, 667
— — Research Laboratory, Drawing Machine, 644
Forgings, Steel, Naval, Properties of, 475, 486
Forms, Flexible Panel, Coolidge Multiple-Dome Dam Construction, 368*
— Wooden, for Pump Casings, Medemblik Pumping Station, 656*
Forrest Lecture, by Prof. R. V. Southwell, on Aeronautical Progress, 1914–1930, 611
Fort Churchill Harbour Works, Hudson Bay Railway, 71
Forth Bridge, Difficulties in Construction of, 238
— — Proposed Road Traffic over, 234
— River, Overhead Power Transmission Line, 603*
Fortuna-Werke A.-G., Grinding Machines at Leipzig Fair, 340*
Foster Instrument Co., Exhibits at Physical and Optical Societies' Exhibition, 128; Automatic Temperature Controller and Recorder, 213*
Foundation Caissons, Forth Bridge, Construction of, 238
— Clay, Bearing Capacity of, 639
— Drainage Wells, Entrance Lock, Ymuiden, North Sea Canal, 4*
— Pile, Ferro-Concrete, Entrance Lock, Ymuiden, North Sea Canal, 6*
— Slab, Ferro-Concrete Lock, Zuyder Zee Reclamation Works, 762*
— Wells, Dredging Gear, Godavery Bridge, India, 160*
Foundry Appliances (Alldays & Onions, Ltd.), 211
— and Engineering Shop, Kenrick Technical College, West Bromwich, 60*
Fourier, Centenary of, 675
Fowler, A. F., the Late, 78
Fowler, R. H., on the Theory of Metals, 595
Fowler, Sir H., 2-6-2 Type Tank Locomotive, 582*
Fox, J., on Initial Stresses in Hard-Drawn Tubes, 65*
Francis Turbines. See *Turbines, Hydraulic*
Fraser and Chalmers Engineering Works, 2,250-kw. Steam Turbine, 797*
Freeth, Major F. A., on the Influence of Technique on Research, 640
French Motor Taxation Formula, 303*, 366
— Navy, Submarine "Diane," Launch, 671
— — and Treaty of Naval Limitations, 575
— Railways, 4-8-2 Type Express Locomotive, 334*
Frequency Meter, Warren Master, 86
— Recorder (Istrumenti di Misura C.G.S.), 87
— Standardisation, North-East England Electricity Scheme, Government Assistance, 143
Friction, Fluid, in Steam Pipes, 579, 587
— Internal, of Sand and Clay, Experiments on, 689*, 753*
— of Journal Bearings, 22*
Frictional Resistance of Ships. See *Ship Resistance*
Frost, Protection of Mortar and Concrete by Salts, 237
Froude Experimental Tank, Research-Fund Appeal, 323
Fuel Consumption of Water Works Machinery, 809*, 839
— Domestic, Use of Soft Coal in Japan, 184
— Economy at Skinningrove, 588*, 610, 617*
— and Fuel Testing in Canada, 234
— Institute of, Annual Prize Essay, 148; Developments and Problems in Coal Cleaning, by Dr. F. S. Sinnatt and D. T. Davies, 449
— Low-Grade, Combustion of, in Russia, 184
— — Temperature Carbonisation of Coal. See *Coal, Low-Temperature Carbonisation*
— Oil. See *Oil Fuel*
— Pump. See *Pump*
— Research Department, Report on Fires in Bunker and Cargo Coal, 463
— — Set, Variable-Compression (Sir W. G. Armstrong, Whitworth & Co. (Engineers), Ltd.), 44*
— Smokeless. See *Coal, Low-Temperature Carbonisation*
— Solid, Production and Preparation, 804
— Synthetic, Production of, 184
— See also *Coal; Oil; Gas; Pulverised Coal*
Fukumaka, S. on Hydro-Electric and Steam Power Plants in Japan, 154
Fulton, R., Work of, 334
Fumes from Electric Power Stations, 741
Funicular Railways, Japanese, 117
Furnace, Blast, Interaction of Gases and Ore, 609, 647*
— —, Practice (Review), 192
— Boiler, Carbofrax Firebricks for, 248
— — Dumping Grate for (Neemes Foundry, Inc.), 122
— — Radiation in, 673
— — Riley-La Mont Water Wall for, 74*
— — See also *Stoker*
— Electric, Ajax-Northrup (Electric Furnace Co., Ltd.), 219
— — Annealing, 60-kw. (General Electric Co., Ltd.), 220*
— — 3-2-kw. and 4-kw. Continuous Types (R.M. Catterson-Smith), 128
— — for Hardening, at D. Brown & Sons (Huddersfield), Ltd., 696
— — High-Frequency Induction, for Vacuum Melting, 781*
— — 30-kw. Portable (Birmingham-Electric Furnaces, Ltd.), 219*
— — Resistor for, 676
— — 30-ton Steel-Melting (Watson's (Metallurgists), Ltd.), 360*
— High-Temperature, Brickwork for, 391
— Metallurgical, Pulverised Fuel in, 185
— Normalising, for Steel Sheets, 583*, 610
— Oil-Heated (British Reverberatory Furnaces, Ltd.), 226
— Open-Hearth, Coke-Oven Gas in, 610, 617*
— Technique, Industrial (Review), 131
— See also *Coke Ovens*
Fusenko, Korea, Hydro-Electric Power Plant, 92
Fusion Welding. See *Welding*

G.

GABB, G. H., Historical Collection of Hydrometers, 823
Gaede Vacuum Pump (W. Edwards & Co.), 130
Gambrell Brothers, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 87
Ganges, River, Floating Dock for, 13
Garage Tool, Universal (F. Gilman (B.S.T.) Ltd.), 211*
Gardner, R., on Single-Reduction Gearing for Turbines, 500*
Gas, Blast-Furnace, Utilisation at Skinningrove Works, 588*
— Carbon Dioxide. See *Carbon Dioxide*
— Coal, Poisoning by, Report, 261
— Coke-Oven. See *Coke Oven*
— Coolers, Becker Coke-Oven Plant, Sheffield, 699*
— Cylinders, Welding of, 349, 353, 362*, 382, 388*, 394*, 427*
— Dehydration of, 742
— Displacement Pump for Drainage Work, 743
— — Pump, Two-Stroke Cycle, Christie's, 404*
— Engineers, Institution of, Leeds Meeting: Programme, 637; Presidential Address by C. S. Shapley, 741; The Institution and the University: Teaching and Research, by Prof. J. W. Cobb, 742; Preparation of a New Road Binder, by C. F. Broadhead, 742; Heat Transmission, with Reference to Methods of Expressing Convection Data, by Dr. M. Fishenden, 742; Gas Dehydration, by Dr. E. W. Smith, 742; Functions of Coke Ovens, by E. G. Stewart, 742; Experiences with a Waterless Gasholder, by F. Prentice, 742; Benzole Recovery and Gas Works Practice, by W. H. Hoffert and G. Claxton, 743
— Exhauster for Sewers (Siemens-Schuckertwerke A.-G.), 376*
— Fired Furnaces. See *Furnaces*
— and Gas Works. See also PARAGRAPH INDEX
— Lighting, Public, A Pioneer of, 740
— Manufacture, Carbon-Monoxide in, 261
— Markets, Extension of, 835
— Natural, Re-Forming in Water-Gas Generators, 679
— Pressure Controller, Automatic (G. Kent & Co., Ltd.), 841*
— Production by High-Temperature Distillation, 835
— Research and Leeds University, 742
— Supply, Area, Departmental Committee's Report, 705. See 699
— — in Japan, 91
— Town, and Coke-Oven Gas, 705
— Turbulence, Effect on Cast Alloys, 357*, 384
— Valves, Automatic, Airship "R.101," 273*
— Water, Carburation of, Butane and Propane for, 148
Gas Welding. See *Welding*
— Works, Coke Ovens in, 742
— — Practice and Benzole Recovery, 743
Gases, Compressed, Theory of Discharge, 515
— Effect on Copper and Bronze, 358*, 384, 457*
— and Ore, Interaction in Blast Furnace, 609, 647*
— See also *Carbon Dioxide; Carbon Monoxide; Hydrogen; Nitrogen; Oxygen, &c.*
Gaseous Combustion at High Pressures (Review), 561
Gasholder, Waterless, Ipswich, 742
Gasoline. See *Petrol; Engine, Petrol; Aeronautics*
Gastpar, J., on Generation and Demand for Energy, 93
Gate Ends, Colliery, Portable Air-Break Circuit Breaker for (G. Ellison, Ltd.), 223*
— Lock, Welland Ship Canal Reconstruction, 157*, 241*, 336*, 400*, 470
— Sluice, Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— Spillway, Automatic, Coolidge Multiple-Dome Dam, 368*
— Tower, Ferro-Concrete, Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— Unwatering, Welland Ship Canal Reconstruction, 468*
— Valves, Taintor, Welland Ship Canal Reconstruction, 592*, 663*, 791*
Gatewood, Capt. R. D., on Operating Costs of Diesel and Steam Cargo Vessels, 263
Gauges, Depth, for Liquids (Liquidometer Co. Inc.), 74*
— and Fine Measurements (Review), 806
— Water, for High-Pressure Boiler, 453
Gear Boxes, Motor Car. See *Motor-Car Details*
— Cutting Machines. See *Machine Tools*
— Reduction, Planetary (Moss Gear Co., Ltd.), 13*
— Spur, Worm, Spiral and Helical, Manufacture by D. Brown & Sons (Huddersfield), Ltd., 559*, 693*. See *Erratum*, 744
— Wheels, Doler Zinc (Doehler Die Casting Corporation), 122
Gearing and Shafting, York Street Mills, Belfast, 795*
— Single-Reduction, for Compound Turbines, 500*
Geared Turbines, Marine. See *Marine Propulsion*
Genders, R., on Macrostructure of Cast Alloys, 357*. See 353, 384; on Aluminium Brasses, 554*. See 398
General Electric Co., Ltd., Transmission-Line Tower-Testing Equipment, 88; 60-kw. Annealing Furnace, 220*; Grünewald Annealing Process, 220, 442*; Electrically-Heated Lead-Melting Pot, 220*; Exhibits at Royal Society Conversazione, 676; 2,812 kv.-a. Alternator, 797*; Switch gear, York Street Works, Belfast, 797*; 150-h.p. Squirrel-Cage Motor, 797*
General Electric Co., Steam-Turbine Development by, 156; Hydrogen-Cooled Synchronous Condenser, 534*
— Mechanics, International Congress on, Liége, 1930, 143
Generating Machine, Gear. See *Gear* under *Machine Tools*
— Station. See *Power Station*
Generator, Electric, and Air Compressor, Oil-Engine Driven (Norris, Henty and Gardners, Ltd.), 204*
— — Aluminium for Rotor Windings, 423
— — 40,000-kw., Barton Power Station Extension, Operating Results, 598*, 684*, 718*, 739, 745
— — 7,500-kw. Diesel-Engine-Driven, Hennigsdorf Substation, Berlin, 411
— — for Electroplating (W. Canning & Co., Ltd.), 223*
— — Electroplating, Motor-Driven (Electrical Power Engineering Co. (Birmingham), Ltd.), 224*
— — 1,000,000-volt Impulse (Metropolitan-Vickers Electrical Co., Ltd.), 314*
— — Lighting Sets, Controller and Starter for (Petters, Ltd.), 205
— — 15,000-kw., Lots Road Power Station, 443
— — Oil-Engine Driven (W. H. Allen, Sons & Co., Ltd.), 206
— — Petrol-Engine Driven Lighting Sets (R. A. Lister & Co., Ltd.), 204*
— — Royal York Hotel, Toronto (Lancashire Dynamo and Motor Co., Ltd.), 278*
— — 32,500 kv.-a. Slow-Speed Alternator, (Brown, Boveri & Co., Ltd.), 743*
— — Steels for Rotors, 141. See 422
— — Stresses in Large Rotors, 421*. See 141
— — 30,000 kv.-a. Three-Phase, Rocky River Hydro-Electric Plant, 97*
— — 2,812 kv.-a., York Street Mills, Belfast, 797*
— — See also *Turbo-Generators*
Gent & Co., Ltd., Idle-Time Recorder for Machines, 215*
Geology, Disrupted Strata (Review), 817
— Engineering (Review), 162
Geophysical Surveying, Seismograph for (Cambridge Instrument Co., Ltd.), 52*
Geophysics, Applied, in the Search for Minerals (Review), 39
— Determination of Thickness of Glacier Ice, 508
Georgii, Dr. W., on Progress of Gliding, 259
German Battleship "Ersatz Preussen," 175*
— Experimental Station for Aerial Navigation, Year-Book (Review), 100
— Federal Statistical Office, Report on Engineering Wages, 146. See 455
— Motor Taxation Formula, 303*, 366
— Navy, Submarine Campaign of, 113
— Power Stations, High Steam Pressures in, 267
— Screw Thread Tolerances (Review), 562
— State Railways, 2,000-h.p. Krupp Turbine Locomotive, Tests, 280*; Turbine Locomotives on, 625; Operation of, 758
— Towns, Steam and Water Heating of, 185
Germany, Diesel Engine, Progress in, 185
— Engineering Wages and Hours in, 455. See 146
— Leipzig Fair, Technical Exhibits, 309*, 340* 373*
— Long-Distance Distribution of Coke-Oven Gas, 705
— Motor Transport in, 709
— Progress of Gliding in, 259
Gesellschaft für Linde Eismachinen A.-G., Plant for Coke-Oven Gas Decomposition, 163*
Gibbons, F., on Reconstruction of Approach Spans, Royal Albert Bridge, Saltash, 426
Giffen, E., on a Simple Transmission Dynamometer, 621*. See LETTERS, 743, 776
Gila River, Arizona, Coolidge Multiple-Dome Dam, 193*, 276*, 368*
Gilman, F. (B.S.T.), Ltd., Universal Garage Tool, 211*
Girders, Forth Bridge, Joining Up of, 238
— River Sone Bridge, 562*. See *Erratum*, 697
Glacier Ice, Determination of Thickness, 508
Glasgow, Atmospheric Pollution in, 825
Glass Containing Cracks, Strength of, 196
— Manufacture, Refractories for, 525
— Safety, Manufacture of, 630.* See LETTER, 679. See *Addendum*, 703
— Technology, Society of, Choice of Annealing Schedule for Commercial Glassware, by J. B. Murgatroyd, 195; Strength of Thermally-Toughened Glass, by Dr. J. T. Littleton, jr., and Dr. F. W. Preston, 195; Strength of Glass Containing Cracks by L. H. Milligan, 196; (Stourbridge Meeting) Manufacture of Refractory Materials in America, by G. V. Evers, 525; Glass House Refractories: A Study of Corrosion-Resisting Properties, by Dr. J. H. Partridge and H. C. Biggs, 525; Practical Results with Sillimanite Glass-House Refractories, by L. C. Gough, 525
— Thermally-Toughened, Strength of, 195
Glassware, Commercial, Annealing of, 195
Glazebrook, Sir R. T., Election to Honorary Membership of Institution of Electrical Engineers, 88
Glenfield & Kennedy, Ltd., Hydraulic Jet Dispersers, 137*
Gliding Association, British, Formation of, 201
Globe, Early Italian, 643
Godavery River Bridge, Handling and Erecting Gear, 160*
Gothenburg, Swedish Industries Fair, 509
Gotoh, K., on Gas and Electricity for Domestic Use in Tokyo, 91
Gough L. C., on Sillimanite Glass-House Refractories, 525
Government Railways. See *Railways*
Governor, Expansion and Compression, for High-Speed Steam Engine (W. Sisson & Co., Ltd.), 570*, 813*
— Geared Turbine-Driven Bore-Hole Pumping Plant, 714*
Grabs, Hand, Well Foundation, Godavery Bridge, 160*
Gracie, Sir A., the Late, 316
"Graf Zeppelin" Airship, Propeller-Shaft Failures, 43
Grafton Power Co., Earth-Pressure Test Laboratory, 689*, 753*
"Grainmotor," M.S., Machinery of, 124
Gramophone Co., Ltd., Exhibits at Royal Society Conversazione, 823
Grant, A. J., Welland Ship Canal Reconstruction, 157*, 241*, 336*, 400*, 468*, 592*, 663*, 711*, 725*, 790*
Grant, L. C., on High-Power Switchgear, 173
Graphitising Reactions in Iron-Carbon Alloys, 642
Grates. See *Furnace; Stoker*
Graving Dock. See *Dock*
Gravitometer, Rapid, for Liquids (W. & T. Avery, Ltd.), 215*
Gravity Davit and Winch (S. Taylor & Sons (Brierley Hill), Ltd.), 668*
— Determination, Timing Apparatus for, 87
Gray Lecture on Progress in Marine Engineering, 49
Grease Lubricating System, Automatic Multi-Point (Keystone Lubricating Co.), 377*
Great Britain, Coal Wages in, 680
— Lakes, Bulk-Freighters, 262
— — Shipyards, War Work of, 262
— Western Railway, South Wales Docks Developments, 385; Reconstruction of Liskeard Viaduct and Approach Spans, Royal Albert Bridge, Saltash, 425; New Station at Temple Meads, Bristol, 605
"Great Western," S.S., Atlantic Voyages, 692
Green, A. H., & Co., Ltd., Thames Motor Tugs, 178
Green, R. H., and Silley Weir, Ltd., Pulverised-Fuel Installation, S.S. "Hororata," 343*
Green Fuel Economiser Co., Cinder and Dust Traps, 248
Greenland Glaciers, Determination of Thickness, 508
Greenwood & Batley, Ltd., 500-kw. Turbo-Generator Set, 779*. See *Erratum*, 798
Gregory, Sir R., on Weather Cycles and Weather Recurrences, 148
Gresham & Craven, Ltd., Feed-Water Heaters, 212*
Griffin & Tatlock, Ltd., Timing Apparatus for Falling Bodies, 87
Grinding Machines. See *Machine Tools*
— Mills, Efficiency of, Report, 24
Grünewald Bright-Annealing Process, 220, 442*
Guildford, St. Joseph's Road Pumping Station, Enlarging Borehole by Explosives, 298*
Guillotine Shears, High-Speed Geared (Brookes (Oldbury), Ltd.), 226
Gunboats. See *Warships*
Gunfire Control, Gyro-Compass for, 323
Gunmetal Castings, Unsoundness in, 358*, 384
Guns, Concrete, Hetch Hetchy Water Supply, San Francisco, 126*
Gutta Percha Co., Ltd., Magnetic and Electric Alloys, 219
Guy, H. L., on Operating Results with Barton Power Station Extension, 597*, 684*, 718*. See 739, 745*
Gyro-Compass for Gunfire Control, 323

H.

HAARLEM Shipbuilding Co., Thames Motor Tugs, 178
Hack Saws, Graduated-Tooth Blades for (" Barsonator " Werkzeug G.m.b.H.), 518
Hackbridge Electric Construction Co., Ltd., Transformer Tap-Changer, 217*
Hackley Concrete Gun, 126*
Hadfield, Sir R., Resistor for Electric Furnace, 676; Exhibits at Royal Society Conversazione, 823
Hadfields, Ltd., Exhibits at British Industries Fair, 225
Hahn, Dr. W., on Propeller and Kaplan Turbines, 268
Haifa, Harbour Construction at, 638
Haigh, Prof. B. P., on Mild and High-Tensile Steels under Alternating and Pulsating Stresses, 231*. See 543. See LETTERS, 632*, 710*; on Fatigue in Lead, 423*. See 399
Hammer Blow and Locomotive Balance, 754*
Handley-Page Auto-Slot, Aeroplane Wings, 613
Hands, J., & Sons, Ltd., Exhibits at British Industries Fair, 207
Hanson, Prof. D., on the Effect of Phosphorus on Copper, 522*. See 385. See *Erratum*, 436
Harbour, Adelaide, Pile-Driving Plant (British Steel Piling Co., Ltd), 57*
— Construction at Haifa, Palestine, 638
— De Haukes, Zuyder Zee Reclamation Works, 762*
— Developments at Cochin, India, 331, 636. See LETTER, 679
— Folkestone, Replacement of Swing Bridge, 645*
— Lyttelton, New Zealand, Development, 332
— and Railways, Kenya and Uganda, Report, 82
— Saint John, Canada, Extension, 720
— Stations, Lay-Out, 659
— Wellington, New Zealand, 779
— Works, Fort Churchill, Hudson Bay Railway, 71
— See also PARAGRAPH INDEX
Hardening Metals. See *Heat Treatment* under *Metallurgy*
Hardness Indicator, Monotron, 129, 252*
— Testa. See *Tests* (*Materials*)
Harfield & Co., Electric Winches, H.M. Fleet-Repair Ship " Resource," 13
Harland Engineering Co., Ltd., Three-Phase Oil Circuit Breaker, 557*; Electric Motor for Lock-Gate Operating Machinery, 594*
Harland & Wolff, Ltd., M.S. " Dunbar Castle," 697*; M.S. " Britannic," 836*
Harrison, Engr.-Capt. J. H., on Materials for Naval Engineering, 473*. See 486
Haseldine, J. F., on Steam Turbines as Applied to Bore-Hole Pumping, 713*, 751*. See 710
Hashiguchi, Y., on Japanese Funicular Railways, 117
Hashimito, K., on Japan's Oil Consumption for Power Uses, 184
Haskew, B. B., on Rebuilding of Bassein Bridges, 503
Hasler Telegraph Works, Flange Lubricator, Railway Wheels, 538*
Haughton, Dr. J. L., on Alloys of Iron with Silicon, 653*. See 642
Haulage Railway, Mandi Hydro-Electric Scheme, 815*
Havlicek, Dr. J., on the Critical Point of Water, 1*. See 88*
Hawkes, Prof. C. J., on Trials of 2,750-h.p. Marine Diesel Engine with Büchi Supercharger, 280*. See LETTERS, 323, 418
Hawthorn, Leslie & Co., Ltd., H.M. Destroyer " Active," 347; H.M. Destroyer " Antelope," 536; H.M. Destroyer " Blanche," Launch, 744
Hayashi, M., on Low-Head Power Plants, 268
Health, Industrial, Research Board, Report on Accident Proneness and Proficiency, 24
— Ministry of, Report on Assessment of Compensation Water, 832
— in the Tropics, Lectures on, 321
Heat Engines. See *Engines; Turbines; Aeronautics*
— Insulation, Magnesia Lagging for Steam Pipes, 579, 587*, 650
— Storage System, Electric-Oil (Browns Dryers, Ltd.), 493
— Transfer in Boiler Furnaces, 673
— — in 600-lb. Pressure Yarrow Boiler, 408
— Transmission in Benson Boiler, 89*
— — through Boiler Tubes, 143, 149
— — and Convection Data, 742
— — Cylinders and Pistons, 2,750-h.p. Marine Diesel Engine with Büchi Supercharger, 280. See LETTERS, 323, 418
— — in Thick Cylinders under Pressure, 818*
— Treatment of Metals. See *Metallurgy*
— Waste. See *Waste Heat*
Heaters, Air, for 600-lb. Pressure Yarrow Boilers, 406*. See 416
— Feed-Water. See *Feed-Water Heater*
Heating Curves, Alloys. See *Metallurgy*
— Electric, of Buildings, 741
— — Progress of, 834
— Methods for Tin and Sheet-Mill Rolls, 611, 615*
— Steam and Water, of German Towns, 185
— System, Royal York Hotel, Toronto, 278
Heatly-Gresham Engineering Co., Ltd., Petrol-Driven Portable Pumping Set, 208*; Railway Brake Testing-Set, 208*
Heckel Co., Ltd., Potash Storage and Shipment Plant, Antwerp, 305*, 365*
Hegenscheidt, W., A.-G., Wheel Lathe, 342*
Helical Gears. See *Gears*
Hell Gate Power Station, Data on, 299
Hematite Prices. See *Metal-Price Diagrams*
Henderson, J. M., & Co., Ltd., Cableways, Nag Hamadi Barrage, River Nile, 252
Hennigsdorf Substation, Berlin, 7,500-kw. Diesel-Electric Generators, 411
Herbert, A., Ltd., Exhibits at Leipzig Fair, 340, 374*; High-Power Plain Milling Machine, 456*
Herbert, E. G., Ltd., Hand-Operated Rail-Cutting Hack Saw, 588*
Herbert, T. M., on Locomotive Firebox Stays and Plates, 30
Hetch Hetchy Water Supply, San Francisco, 125*. See 252
Hide, W. D., the Late, 138
High Frequency. See *Electric*
— Speed Steel. See *Steel*
— Temperature Tests. See *Tests* (*Materials*)
Highfield Electrical Co., Ltd., Electrical Dynamometers, 438*. See 229
Highways. See *Roads*
Hilger, A., Ltd., Spectrographic Apparatus, 52; Fabry-Pérot Etalon, 675
Hill, Engr. Rear-Admiral W. S., on Powdered Coal for Ship Propulsion, 287
Hill, L., on Diving, 259
Hindmarsh, R. F., on Tyne Commission Quay, North Shields, 332
" Hindustan," Royal Indian Marine Sloop, Launch, 702
Hirose, I., on Parallel Operation of Hydraulic and Steam Power Plants in Japan, 154
History of Naval and Marine Engineering, 333, 498, 690
— of Science and Technology, International Congress, 568
H.M. SS. See under *Warships*
Hobbing Machines, Gear. See *Gear* under *Machine Tools*
" Hobson's Bay," S.S., Reconditioning of, 541
Hodges Brothers, Two-Stroke Gas-Displacement Pump, 404*
Hoehn, E., on Strength of Dished Ends, 190*. See LETTER, 517
Hoffert, W. H., on Benzole Recovery and Gas Works Practice, 743
Hohenzollern Colliery, Aerial Coal Transporter with Travelling Tower, 629*
Hoist, Electric Trolley (Shepard Niles Crane and Hoist Corporation), 122*
— See also *Cranes*
Holland-America Liner " Statendam," High-Pressure Steam Installation, 491*, 513
— North Sea Canal, Entrance Lock, Ymuiden, 3*, 67*
— Research Work in, 641
— Zuyder Zee Reclamation Works, 655*, 759*, 770, 821*. See LETTER, 743
— See also *Dutch*
Hollands, H. W., on Pulverised Fuel, 185
Hollings & Guest, Ltd., 12-in. Hydraulic Three-Plate Press, 206*
Holmes Magnetic Master Compass (H. Hughes & Son, Ltd.), 130
Home Office Report, Chains and Other Lifting Appliances, 241
— — Report, Effects of Asbestos Dust, and Dust Suppression, 577
Honours Lists, New Year's, 18; King's Birthday, 743
Hooghly River, Cable Tunnel under, 124
Hooks, Crane, Factor of Safety for, 241
Hoover Medal, Award to H. Hoover, 548
Hopkinsons, Ltd., Electrically-Operated Engine-Room Telegraph, 392*
Hopper, Travelling, Potash Storage and Shipment Plant, Antwerp, 305*
Horns, Safety, Welland Ship Canal Reconstruction, 336*, 401*
" Hororata," S.S., Pulverised-Fuel Installation, 343*
Horsley Bridge and Engineering Co., Ltd., Folkestone Harbour Swing Bridge, 645*
Hotel, Royal York, Toronto, Engineering Equipment of, 279*
Hothersall, A. W., on Stopping-Off Materials for Nickel Plating, 536
Hounslow and Slough, Experimental Road, 321
Hours of Labour. See *Labour*
Housel, Prof. W. S., Experiments on Bearing Capacity of Clays, 639
Houses, Steel Construction, 749
— Working-Class, Financial Provision, 707
Hovgaard, Prof. W., on Stiffness of Pipe Bends, 579
Howard, J. & F., Ltd., 12-ton Petrol Locomotive, 504*
Howden-Buell System, Pulverised-Fuel Installation, S.S. " Hororata," 343*
Howden, T. C., & Co., Huggenberger Tensometer, 502*
Howell Electric Motors Co., Single-Phase Motor, 248*. See *Erratum*, 567
Hoy, Sir W., the Late, 254
Huddersfield Gear-Cutting Works, D. Brown & Sons (Huddersfield), Ltd., 550*, 693*. See *Erratum*, 744
Hudson, Dr. O. F., on Locomotive Firebox Stays and Plates, 30
— Bay Railway, Fort Churchill Harbour Works 71; Proposed Connections, 355
— River Bridge, Cost of, 114
— — Tunnel, Difficulties in Construction, 238
Hudswell, Clarke & Co., Ltd., 300-h.p. Diesel Locomotive, 324*
Huggenberger Tensometer, 502*
Hughes, H., & Son, Ltd., Holmes Magnetic Master Compass, 130
Humidity Recorder (Cambridge Instrument Co., Ltd.), 54
Humphrey, H. A., on Power Plant at Billingham, 350
Hydraulic Engineering, Problems in (Review), 817
— Jet Dispersers, Arapuni Hydro-Electric Scheme, 137*
— Losses in Pipe Bends, 268
— Machine Tools. See *Machine Tools*
— Power Plant. See *Power Plant*
— Paradox, Mean Speed of a Jet, 303
— Press. See *Press* under *Machine Tools*
— Pumps. See *Pump*
— Turbines. See *Turbines; Power Plant*
Hydraulics, Sluice-Discharge Measurements, Assouan Dam, 23
Hydro-Electric Power Plant. See *Power Plant*
Hydrodynamics, Flow from Nozzles and Coefficients of Discharge, 803
— See also *Ship Resistance*
Hydrogen-Cooled Synchronous Condenser, 534*
— Effect on Copper and Bronze, 358*, 384, 457*
— Plant, Silicol, Airport of St. Hubert, Montreal, 844
— Production from Coke-Oven Gas, Duisburg, 165*
Hydrometers, Historical Exhibit, 823
Hydrostatic Uplift under Masonry Dams, 181*, 235*

I.

ICE, Glacier, Determination of Thickness, 508
Idle-Time Recorder for Machines (Gent & Co., Ltd.), 215*
Igranic Electric Co., Ltd., Exhibits at Physical and Optical Societies' Exhibition, 129
Illinois, University of, Memoir on Plaster-Models for Stress Determination, 231
Illumination Congress, International, Great Britain, 1931, 143, 799
— Research Committee, Adoption of " Daylight Factor," 550
Impact on Railway Bridges, 754*
— Reactions of Motor-Lorry Wheels, 69, 95
— Tests. See *Tests* (*Materials*).
Imperial Chemical Industries, Ltd., Power Plant at Billingham, 350
— University of Tokyo, Research Institutes, 19
Implements, Ancient Egyptian, Metallography of, 641
Impounding Dam, Welland Ship Canal, 791*
Impulse Turbines. See *Turbines*
Inawashiro, Japan, Hydro-Electric Power Plant, 19
Inchicore Substation, Southern Ireland Electricity Scheme, 731*
India, Bridge Reconstruction in, 503
— Calcutta, Cable Tunnel under River Hooghly, 124
— Cochin, Harbour Developments at, 331, 636. See LETTER, 679
— Godavery River Bridge, Handling and Erecting Gear, 160*
— Jamshedpur Steel Works, Rolling-Mill Plant, 103*
— Mandi Hydro-Electric Scheme, 815*
— River Ganges, Floating Dock for, 13
— Steam Communication with, 498
Indian Marine Sloop " Hindustan," Launch, 702
— State Railways, Re-Girdering of Lower Sone Bridge, 562*. See *Erratum*, 697
— — Railways, Loading Diagram, 566*
Indicator Diagrams, 2,750-h.p. Marine Diesel Engine with Büchi Supercharger, 280*. See LETTERS, 323, 418
— — Two-Stroke Junkers Heavy-Oil Engine, 472*
— Strain, Airship Mooring (Cambridge Instrument Co., Ltd.), 584*. See 273*
— Safe-Load, for Cranes (Nash Safe-Load Indicators, Ltd.), 807*
Induction Furnaces. See *Furnace, Electric*
— Motor. See *Motor, Electric*
Indus River, Reconstruction of Attock Bridge, 503
Industrial Accidents. See *Accidents*
— Agreements and Disputes. See *Labour*
— Chemistry. See *Chemistry*
— Economics. See *Labour*
— Furnaces. See *Furnaces*
— Management. See *Works Management*
— Psychology, National Institute of, Annual Report, 320
— Research. See *Research*
Industries. See also *Trade*; and PARAGRAPH INDEX
Industry and Commerce, Association for Education in, Annual Report, 772
— and Crafts, Electric Power Supply in, 833
— Iron and Steel, and Science, 751
— Rationalisation in, 834
— and Technical Institutions, 17
Ingersoll-Rand Marine Oil Engine, Tug " Irande," 106*
Ingots, Aluminium, Casting of, 554
— Brass, Macrostructure of, 357*, 384
— Copper, Soundness in, 384, 457*
— Steel, for Large Rotors, 422
Ino, M. on the Diesel Engine in Japan, 186
Institute of Transport. See *Transport*
— See *Institution*
Institution, Royal. See *Royal Institution*
— Technical, Specialist Sections of, 230
— — and Scientific. See *Aeronautical Society, Royal; Arts, Royal Society of; Australia, Institution of Engineers; Automobile Engineers, Institution of; Automotive Engineers, American Society of; British Architects, Royal Institute of; British Association; British Columbia Association of Professional Engineers; Builders, Institute of; Canada, Engineering Institute of; Compressed Air Society, British; Civil Engineers, American Society of; Civil Engineers, Institution of; Diesel Engine Users' Association; Electrical Engineers, Institution of; Engineers-in-Charge, Institution of; Engineers and Shipbuilders in Scotland, Institution of; Faraday Society; Fuel, Institute of; Gas Engineers, Institution of; Glass Technology, Society of; Industry and Commerce, Association for Education in; Industrial Psychology, National Institute of; Iron and Steel Institute; Iron and Steel Institute, American; Junior Institution of Engineers; Locomotive Engineers, Institution of; Manchester Association of Engineers; Manchester Steam Users' Association; Marine Engineers, Institute of; Massachusetts Institute of Technology; Mechanical Engineers, American Society of; Mechanical Engineers, Institution of; Meteorological Society, Royal; Metals, Institute of; Municipal Electrical Association; Naval Architect, Institution of; Naval Architects and Marine Engineers, American Society of; Newcomen Society; North East Coast Institution of Engineers and Shipbuilders; Optical Society; Patentees, Institute of; Petroleum Technologists, Institution of; Physical Society; Physics Institute of; Royal Institution; Royal Society; Sanitary Institute, Royal; Structural Engineers, Institution of; Testing Materials, New International Association for; Transport, Institute of; Water Engineers, Institution of; Welding Engineers, Institution of; Whitworth Society; Women's Engineering Society.*
Instrument Makers, English, of the Eighteenth Century, 772
— Pivots (Everett, Edgcumbe & Co., Ltd.), 86*
Insulation. See *Heat; Electric*
Insurance, Workmen's. See *Labour*
Internal-Combustion Engines. See *Aeronautics; Engines; Motor Cars; Tractors*
— Grinder. See *Grinder* under *Machine Tools*
International Combustion, Ltd., Pulverised-Fuel Boiler Plant, 797*
— Congress on General Mechanics, Liége, 1930, 143
— Illumination Congress, Great Britain, 1931, 143, 799
— Railway Congress, Madrid. See *Railway Congress*
— Standard Electric Corporation, Properties of Permalloy C, 567*
— Trade. See *Trade*
Inverter, Mercury, 92
Ipswich, Waterless Gasholder at, 742
" Irande," Diesel-Engined Tug (J. I. Thornycroft & Co., Ltd.), 106*
Ireland, Electric Power Supply in, 731*. See *Erratum*, 767
Iron Alloys. See *Metallurgy* and *Steel*
— Corrosion. See *Corrosion*
— Early Production of, 352
— Furnaces. See *Furnaces*
— Heat Treatment. See *Metallurgy*
— Industry, United States, Wages and Hours in, 252
— Manufacture, Electro-Metallurgical Plant at Sault Ste. Marie, 256
— — See also *Furnaces, Blast; Metallurgy*
— Ore. See *Ore*
— Pig, Prices. See *Metal-Price Diagrams*
— Rolling Mills. See *Rolling Mills*
— and Steel, Import Trade, 478
— — Industry and Science, 751
— — Nickel-Bearing, Extended Use of, 750
— — Institute, American, Chromium-Manganese Steels, by Dr. F. M. Becket, 749; Steel House Construction, by L. H. Miller, 749; Some Comments on Steel Specifications, by J. Johnston, 749; Steel-Plant Lubrication, by W. A. James, 749; Utilisation of Waste Heat in the Steel Industry, by C. W. E. Clarke, 749; Developments in Nickel-Iron and Steel by C. McKnight, 750; Contribution of Science to the Iron and Steel Industry, by A. D. Little, 751

Iron and Steel Institute :

Spring Meeting, London:
Programme, 454, 541
Report of Council, 582
Presentation of Bessemer Medals to E. Schneider and Dr. W. Rosenhain, 582, 609
Award of Scholarships, 641
Annual Dinner, 643
Reports of Discussions, 609, 641
Thin-Pack Normalising or Heat Treatment *versus* Box-Annealing of Sheets, by R. Whitfield, 582*. See 610
Interaction of Gases and Ore in the Blast Furnace, by Prof. W. A. Bone, Dr. L. Reeve and Dr. H. L. Saunders, 647*. See 609
Developments in Fuel Economy at Skinningrove, by F. Bainbridge, 588*, 617*. See 610
Tin and Sheet-Mill Rolls in Service, by E. R. Mort, 615*. See 611
Metallography of Some Ancient Egyptian Implements, by Sir H. C. H. Carpenter and Dr. J. M. Robertson, 641
Some Alloys for Use at High Temperatures: Nickel-Chromium and Complex Iron-Nickel-Chromium Alloys, by Dr. W. Rosenhain, C. H. M. Jenkins, H. J. Tapsell, Dr. C. R. Austin, and N. P. Rees, 780*, 811*. See 641
Chromium-Copper Structural Steels, by J. A. Jones, 687*. See 642
Constitution of the Alloys of Iron with Silicon, by Dr. J. L. Haughton and Dr. M. L. Becker, 653*. See 642
Carburising and Graphitising Reactions between Iron-Carbon Alloys, Carbon Monoxide and Carbon Dioxide, by Dr. M. L. Becker, 642
Effect of Melting Conditions on the Microstructure and Mechanical Strengths of Grey Cast Irons, by Dr. A. L. Norbury and E. Morgan, 643
Properties of Some Steels containing Chromium, by A. R. Page and Dr. J. H. Partridge, 680*. See 643
History of the Cementation Process, by D. Brownlie and Baron de Laveleye, 643
Corner Ghost in Steel Ingots, by Dr. S. Maita, 643.

Iron and Steel. See also PARAGRAPH INDEX
— — Works. See *Works*
— Stove Plates, History of (Review), 191
— Tests. See *Tests* (*Materials*)
— — Welding. See *Welding*
— Wrought, for Chains and Hooks, 241
— See also *Cast Iron; Steel; Pig Iron; Metallurgy*
Irrigation Scheme, New South Wales, 351
— See also PARAGRAPH INDEX
Isherwood System, Ship Construction, Annual Return, 202
Isotopes, Detection by Mass Spectrograph, 397*, 437
— Problems of, 461*
Istrumenti di Misura C. G. S., Exhibits at Physical and Optical Societies' Exhibition, 87

Italian Motor Taxation Formula, 303*, 366. See LETTERS, 776, 808
— Navy, Trials of Flotilla Leaders, 530, 568
— State Railways, Oil-Driven Rail-Car with Electric Transmission, 7*. See 186*, 624

J.

JACKSON, R., on Pulverised-Coal Firing, 184
Jacobson, C. A., on Air Pre-heaters and Similar Apparatus, 155
Jaeschke, A., on Refractory Bricks, 390
James, Prof., R. V., on Plaster Models for Stress Determination, 231
James, W. A., on Steel Plant Lubrication, 749
Jamshedpur Steel Works, Rolling Mill Plant, 103*
Japan, Coal Resources of, 183
— Diesel Engine Progress in, 186
— Electric Power Supply in, 91, 92
— Hydraulic Turbine Development in, 268
— Imports and Exports, 321
— Inawashiro and Kiso River Hydro-Electric Power Plants, 19
— Nagoya, Toyoda Automatic Loom Works, 19
— Oil Consumption for Power Purposes, 184
— Petroleum Resources of, 184
— River Arakawa Improvement Works, 18
— Ruths Accumulators in, 155
— Shinano-Gawa Hydro-Electric Power Plant, 154
— Soft Coal as Domestic Fuel, 184
— Steam and Hydro-Electric Power Plants, Joint Operation, 154
— Transportation and Distribution of Coal, 183
— World Engineering Congress in. See *Engineering Congress*
— — Power Conference. See *World Power Conference*
Japanese Coalfields, 20
— Funicular Railways, 117
— Government Railways, Train Ferries, 117; Analysis of Rail Failures, 708
— — Steel Works, Yawata, 19
— Hydro-Electric Plants, Reservoirs for, 267
— Imperial Mint, Osaka, 19
— Markets, Great Britain's Position in, 321
— Navy and Treaty of Limitations, 575
Jenkins, C. H. M., on Nickel-Chromium Alloys for High Temperature, 780*, 811*. See 641
Jet Dispersers, Hydraulic, Arapuni Hydro-Electric Scheme, 137*
Johns, A. W., Appointment as Director of Naval Construction, 35
Johnston, J., on Steel Specifications, 749
Joints, Expansion, Monolith, Welland Ship Canal Reconstruction, 243*
— Fusion-Welded, for High Strength, 364*, 386*
— Pipe, Flexible (Barco Manufacturing Co.), 250
Jones, B., on Fatigue in Lead, 423*. See 399
Jones, J. A., on Chromium-Copper Structural Steels, 687*. See 642
Jones, W. R. D., on Metallic Magnesium, 394. See 400
Josse, Prof. von E., on Ruths Accumulators in Industrial Plants, 155. See 764*
Journal of Tour in Scotland, 1819, Southey's (Review), 501
— See *Bearings*
Jubilee of American Society of Mechanical Engineers, 545
Junior Institution of Engineers, Presidential Address, by Sir E. W. Moir, on Engineering Difficulties, 238; Annual Dinner, 578; Durham Bursary, 604
Junkersmotorenbau G.m.b.H., Heavy-Oil Aero Engine, 471*

K.

KAMO, Prof. M., on Low-Temperature Carbonisation of Korean Brown Coal, 184
Kanaya, K., on Interference from Power Lines, 93
Kano Water Supply Scheme, Nigeria, 114
Kaplan and Propeller Type Turbines, 264
Karelitz, G. B., on Ring-Oiled Bearings, 146*
Karges-Hammer, A.-G., Lidding Machine for Tins, 374*
Kawamura, T., Comparison of Oil-Burning Steamships and Motorships, 186
Kawasaki Dockyard, Kobe, 19
Kazipet-Belharshah Railway, Construction of Godavery Bridge, 160*
Keary, Miss E. M., on Resistance and Form of Towed Barges, 531
Kelen, Dr. N., on Safety and Watertightness of Dams, 267. See *Erratum*, 411
Kelly Co., Parallel-Slide Valves, 250
Kelvin, Bottomley & Baird, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 128
— Lecture on the Theory of Metals, 595
Kennedy, A., Junr., on Ship Propulsion and Power Plant Engineering, 156
Kennedy, Sir A. B. W., Work of, 94
Kenrick Technical College, Engineering Shop and Foundry, 60*
Kent, G., & Co., Ltd., Planimeters, 52*; Automatic Gas-Pressure Controller, 841*
Kent and Leven Viaducts, Reconstruction, 426
Kenya and Uganda Railways and Harbours, Report, 82
Kerr, H. S., On Re-Girdering River Sone Bridge, 562*. See *Erratum*, 697
Kerr, Stuart & Co., Ltd., Diesel-Engined Lorry, 169*
Keys, Monolith, Welland Ship Canal Reconstruction, 242*
Keystone Lubricating Co., Multi-Point Grease Lubricating System, 377*
Kill van Kull Bridge, New York, Cost, 114
Kilns, Cement, Rotary, Pulverised-Fuel Firing, 185
— Tunnel, for Porcelain Insulator Manufacture, 634*
Kinematics of Machines (Review), 38
"King George V," S.S., Boiler Explosion, 453
King, J. H., on Economy in Marine Steam Machinery, 262
King's College, London, Lectures on Engines for Aircraft, 254
Kingston-on-Thames Power Station, Extension, 503
Kipps, Locomotive Coaling Plant at, London & North-Eastern Railway, 330*
Kirkstall Road Power Station, Leeds, Engine-Room Telegraph, 392*
Kiso River, Japan, Hydro-Electric Power Plants, 19
Kobe, Kawasaki Dockyard, 19
Kohn, R. D., on the New York Building Congress, 706
Kolb, H., Radial Drilling Machine, 311*
Korea, Fusenko Hydro-Electric Plant, 92
Korean Brown Coal, Low-Temperature Carbonisation of, 184
Koukel-Krajewsky, S. A., on Power Supply of Russian Industries, 184
Kraft, Prof. E. A., Back-Pressure and Bleeder Turbines, 267
Kreuger Cell, Measurement of Impact Forces, 70
Krupp, F., A.-G., 2,000-h.p. Turbine Locomotive Tests, 2-0*
Kubota, Y., on the Fusenko Hydro-Electric Power Plant, 92
Kumardhubi Engineering Works, Ltd., Steel Girders, River Sone Bridge, 562*. See *Erratum*, 697

L.

LA MONT-RILEY Water Wall for Boiler Furnaces, 74*
Laboratory, Earth-Pressure Testing, 689*, 753*
— Research, High-Voltage (Metropolitan-Vickers Electrical Co., Ltd.), 312*

Labour:

Coal Industry, International Wages in, 23, 252, 6-0
Employment Statistics, Engineering and Allied Industries, 20, 51, 82, 114, 145, 176, 229, 260, 2-9, 307
Houses, Working-Class, Financial Provision for, 707
Industrial Accidents. See *Accidents*
— Health Research Board, Report on Accident Proneness and Proficiency, 24
— Psychology, National Institute, Report, 320
Labour Notes, 11, 42, 76, 118, 135, 178, 197, 251, 294, 322, 356, 388, 420, 441, 488, 518, 537, 569, 614, 646, 666, 712, 730, 763, 794, 824. See PARAGRAPH INDEX
Mines, Ventilation and Health in, 295
Pension Scheme, Lancashire Electric Power Co., Ltd., 487
Petroleum Industry, Californian, Fatalities in, 324
Railway Staffs, Co-Operation of, 725
— — Training of, 819
Skilled Employment and Apprenticeship Association, Annual Report, 829
Unemployment Statistics, Engineering and Allied Industries, 20, 51, 82, 114, 145, 176, 229, 260, 289, 307
Wages, Coal, in Belgium, Poland and Great Britain, 6-0
— Engineering, in Germany, 146, 455
— and Hours in United States Coal and Iron Industries, 252
— International, in Coal Industry, 23, 252, 6-0
Lacey, G., on Stable Channels in Alluvium, 179
Lagging Materials. See *Heat Insulation*
Lake, G. H., on Pulverised Fuel and Boiler-House Operation, 740
— Storage, Amsteldiep, Zuyder Zee Reclamation Works, 762*
— Victoria, Traffic on, 82
Lamb, H. C., on Operating Results with Barton Power Station, 597*, 634*, 718*. See 739, 745*
Laminated Springs, Researches on, 26*
Lancashire Boiler. See *Boiler*
Lancashire Dynamo and Motor Co., Ltd., 400-kw. Motor-Generator Sets and Motors, Royal York Hotel, Toronto, 278*
Lancashire Electric Power Co., Ltd., Pension Scheme, 487
Lancaster, R., on Zinc-Base Die-Casting Alloys, 420*. See 399. See LETTER, 517
Lancegaye Safety Glass, Ltd., Hydraulic Press with Flexible Platen, 630*. See LETTER, 679. See *Addendum*, 703
Lanchester, Dr., and Aeronautical Progress, 811
Land-Reclamation Works, Zuyder Zee, 655*, 779*, 770, 821*. See LETTER, 743
Landing Stage, Passenger, Tilbury, 678*
Langerbrugge Power Station, Working Temperature in Boilers, 416
Larssen Steel Piling, Zuyder Zee Reclamation Works, 762*, 821*
Latent Heat of Steam, American Researches on, 257
Lathes. See *Machine Tools*
Launches and Trial Trips, 24, 78, 138, 170, 234, 263, 326, 387, 419, 487, 517, 540, 582, 645, 702, 775, 798, 828
Law. See *Legal*; *Labour*
Laws, Dr. B. C., on Behaviour of Two Passenger Vessels at Sea, 515. See LETTER, 572
Le Grand, Sutcliffe and Gell, Ltd., Enlarging a Borehole by Explosives, 298*
Lead Alloys. See *Alloys* under *Metallurgy*
— Corrosion in Buildings, Report, 494
— Investigations on Fatigue in, 399, 423*
— Melting Pot, Electrically-Heated (General Electric Co., Ltd.), 220*
— Pipes, Creep Tests of, 328, 772*
— Prices. See *Metal-Price Diagrams*
Leaky-Harper Drawing Machine (Cambridge Instrument Co., Ltd.), 644
Leather Bullets for Cleaning Condenser Tubes, 718*
Ledward & Beckett, Portishead Power Station, Steelwork and Operating Machinery, 433*
Lee & Fouracre, Concrete Block and Slab Machines, 211
Leeds, Kirkstall Road Electric Power Station, Engine-Room Telegraph, 392*
— University and Gas Research, 742
Leemans Pumping Station, Zuyder Zee Reclamation Works, 655*, 761*
Lees, H., & Co., Ltd., Locomotive-Coaling Plant, 330*

Legal:

Charing Cross Bridge Bill, Objections to, 640
Irish Electricity Acts, 731
Labour Legislation. See *Labour*
Manchester Ship Canal, Heavy Traffic over Bridges, Lawsuit, 411
Reservoirs (Safety Provisions) Bill, Objections to, 516
See also PARAGRAPH INDEX
Legislation. See *Legal*; *Labour*
Leicester College of Technology, Industrial and Commercial Administration Course, 800
Leipzig Fair, Technical Exhibits, 309*, 340* 373*
Lentz Patents, Ltd., Rotary Cam Poppet Valve Gear for Locomotives, 39*
Letters to the Editor, 22*, 43, 134*, 178, 234, 263, 323, 378, 418, 454, 487, 516, 550, 571, 632, 679, 710*, 743, 776, 803, 838. See LETTERS INDEX
Leven and Kent Viaducts, Reconstruction, 426
Lidding Machine for Tins, 374*
Lidgerwood Cableway, Hetch Hetchy Water Supply, San Francisco, 512*
Liége International Congress on General Mechanics, 143
— International Exhibition, 548. See 829
Lifting Appliances and Chains, Report, 241
— Bridges. See *Bridges*
Life-Saving Appliances for Ships, 491
Light Alloys. See *Alloys* under *Metallurgy*
— Polarised, Stress Determination by. See *Optical*
Lighting of Buildings, "Daylight Factor," 550
— Gas. See *Gas*
"Lightning," H.M.S., History of, 498
— See *Electric*
Lignite, Development in Canada, 455
Limitorque Corporation, Electrical Operating Gear for High-Pressure Valve, 249*
Lincoln Prize Papers, Arc Welding (Review), 452
Linde Canadian Refrigeration Co., Refrigerating Plant, Royal York Hotel, Toronto, 279*
— Plant, Coke-Oven Gas Decomposition, 163*
Lindhagen, M. T., on Ljungström Steam Turbines, 156
Lindmark, Prof. T., on Heating Surfaces of Boilers, 155
Liners. See *Steamers*
Liquids, Depth Gauges for (Liquidometer Co., Inc.), 74*
— Flow of, Mean Speed of Discharge, 803
— Fuel. See *Oil Fuel*.
— Rapid Gravitometer for (W. & T. Avery, Ltd.), 215*
— and Vapours, Properties of, 1*. See 88*
Liquidometer Co., Inc., Depth Gauges for Liquids, 74*
Liskeard Viaduct, Reconstruction of, 425
Lister, R. A. & Co., Ltd., Petrol-Driven Automatic Lighting Sets, 204*
Literature, 38, 98, 130, 162, 191, 274, 452, 500, 561, 676, 806, 817. See LITERATURE INDEX
Litigation. See *Legal*; *Labour*
Little, A. D., on Science and the Iron and Steel Industry, 751
Littleton, Dr. J. T., Jr., on Strength of Thermally-Toughened Glass, 195
— Pumping Installation, Comparative Estimates for, 839
Liverpool and Manchester Railway Centenary (Review), 130
— Replacement of Railway Bridge, Walton Hall Avenue, 696*
"Liverpool," S.S., Atlantic Voyages of, 692
Liversedge, A. J., on Engineering Markets of the World, 777*
Ljungström Air-Preheaters, Tests of, 155
— Steam Turbines, 156
"Llangibby Castle," M.S., Gravity Davit and Winch, 668*
Lloyd's Register, Aviation Advisory Committee, 108
— Statistics, Vessels under Construction 88, 513
— — Vessels Launched, 166
Load Factor, Influence on Cost of Electric Power, 92, 122*
— Models, Three-Dimensional, and Current Tariffs, 835
Loading Diagram, Indian State Railway, 566*
Local Authorities. See *Municipal*
Loch Long, Deep-Sea Diving Experiments in, 259
Lock, Entrance, Ymuiden, North Sea Canal, 3*, 67*
— Ferro-Concrete, Zuyder Zee Reclamation Works, 762*, 821*
— Welland Ship Canal Reconstruction, 157*, 241*, 336*, 400*, 468*, 592*, 663*, 711*, 725*, 790*
Lockouts. See *Labour*; *Labour Notes*
Locomotive Balance and Hammer Blow, 754*
— Boilers, Investigations on Firebox Stays and Plates, 30
— Coaling Plant at Kipps, London and North Eastern Railway, 330*
— 300-h.p. Diesel Engine (Hudswell, Clarke, & Co., Ltd.), 324*
— Diesel, Progress of, 623
— Electric, for Main-Line Traction, 722
— — 1,500-volt, 5,400-h.p., Paris, Lyons & Mediterranean Railway, Tests, 793
— — 7,200-h.p., Swiss Federal Railways, 509. See *Addendum*, 637
— Engineers, Institution of, Formation of Birmingham Centre, 279
Locomotive, Feed-Water Heaters for, 626
— High-Pressure, with Geared Uniflow Engine and Water-Tube Boiler, Operating Results, 625
— — Pressure, Schmidt-Henschel, Operating Results, 625
— — Pressure Steam, 266
— — Pressure Steam. Progress of, 625
— Industry, Position and Prospects, 229
— Internal-Combustion Engine, on United States Railways, 117
— Oil-Driven, Efficiency of, 110
— — Driven (Orenstein und Koppel A.-G.), 376*
— — Driven, Power Transmission, 836
— — Electric, Operating Costs, 758
— — Electric, Progress of, 624
— Passenger, with Rotary Cam Poppet Valve Gear, London and North Eastern Railway, 39*
— Petrol, 12-ton (J. & F. Howard, Ltd.), 504*
— Road. See *Motor*; *Road*; *Tractor*
— Steam, Heat Economy of, 266
— — Superheaters for, 626
— Tender, with Exhaust-Turbine Drive, 625
— Turbine, 2,000-h.p., German State Railways, Tests, 280*
— — Progress of, 623
— 4-6-0 Type, with Beardmore-Caprotti Valve Gear, London & North Eastern Railway, 133*
— 4-8-2 Type Express, Est Railway, 334*
— 2-6-2 Type Tank, London, Midland & Scottish Railway, 582*
— 4-4-0 Type "Y" Class Passenger, Southern Railway, 408*
— Valve Gears for, 626
— Zoelly Turbine, 266
— See also *Railways* in PARAGRAPH INDEX
Loewe, L., & Co., A.-G., High-Speed Automatic Drilling Machines, 29*; Single-Lever Controlled Milling Machine, 183*; Cylindrical and Plunge Grinding Machine, 343*
Löffler, Prof. von St., on Generation of Super-Pressure Steam, 58*
London, Atmospheric Pollution in, 825
— County Council and Charing Cross Bridge Scheme, 114, 640
— — Council, Report on Thames Floods Prevention, 382
— — Council School of Engineering and Navigation, Lectures on High-Tension Electricity, 148
— King's College, Lectures on Engines for Aircraft, 254
— Lots Road Power Station, Reconstruction of, 443*
— Midland & Scottish Railway, Furness Section, 2-6-2 Type Tank Locomotive, 582*; Reconstruction of Kent and Leven Viaducts, 426; Turbine Locomotive, Operating Results, 624; Tilbury Station, 678*
— & North Eastern Railway, Three-Cylinder Passenger Locomotive with Rotary Cam Poppet Valve Gear, 39*; 4-6-0 Locomotive, with Beardmore-Caprotti Valve Gear, 133*; Locomotive-Coaling Plant at Kipps, 330*; Tests of Locomotives, 626
— Port of, Tilbury Passenger-Landing Stage, 678*
— School of Hygiene and Tropical Medicine, Lectures on Health in the Tropics, 321
— St. Paul's Cathedral Re-Opening, 831. See 823
— Underground Railways. See *Underground*
— University College (1826-1926) (Review), 98
— — College, Goldsmid Engineering Scholarship, 88
— Water Works, Pumping Machinery, 809*, 839*
Longbottom, Sir B., the Late, 604
Loom, Automatic, High-Speed, 19
Lorries. See *Motor Wagons*; *Tractors*
Lots Road Power Station, Reconstruction of, 443*
Low-Temperature Carbonisation of Coal. See *Coal*
Lowndes, E. C., on Pulverised Fuel, 185
Lubricating Oils, Synthetic Production of, 184
— — See also *Oils*
— System, Grease, Automatic Multi-Point (Keystone Lubricating Co.), 377*
Lubrication, Film, of Journal Bearings, 22*
— of Steel Works Plant, 749
Lubricators (Trier Bros., Ltd.), 225
— Flange, for Railway Wheels (Hasler Telegraph Works), 538*
Lunkenheimer Co., 1,350-lb. Pressure Stop Valve, 75*
Lysholm, A., on Tests of Ljungström Air-Preheaters, 155; on Ljungström Steam Turbines, 156
Lyttelton Harbour, New Zealand, Development of, 332

M.

MAATSCHAPPIJ tot Uitvoering van Zuiderzeewerken, Ltd., Medemblik-Den Oever Embankment, 655*, 759*
MacNaughtan, D. J., on Stopping-Off Materials for Nickel Plating, 536
Mac. See also *Mc*
Machines, Kinematics of (Review), 38
— Shops. See *Works* and *Machine Tools*

Machine Tools:

Bottoming Machine for Tins (L. Schuler A.-G.), 373*
Chuck, Air-Operated (Pittler Werkzeugmaschinenfabrik A.-G.), 376*
Dovetailing Machine, Multiple-Spindle (Böttcher und Gessner), 310*
Drill, Bench, Electrically-Driven High-Speed (L. Loewe & Co. A.-G.), 29*
Drilling Machine, Radial (F. Braun A.-G.), 309*
— — Radial (H. Kolb), 311*
— — Radial, Direct Motor-Driven (W. Asquith, Ltd.), 426*

Machine Tools—*continued.*

Drilling and Tapping Machine, Automatic (L. Loewe & Co. A.-G.), 29*
Flanging Press, Hydraulic Boiler-Plate (Rice & Co. (Leeds), Ltd.), 14*
Garage Tool, Universal (F. Gilman (B.S.T.), Ltd.), 211*
Gear-Cutting Works, D. Brown & Sons (Huddersfield), Ltd., 559*, 693*. See *Erratum*, 744
Generating Machine, Turbine Gear (D. Brown & Sons (Huddersfield), Ltd.), 560*
— — 108-in. Worm-Wheel (D. Brown & Sons (Huddersfield), Ltd.), 693*
Grinder, High-Speed Swing-Frame (Pneulec, Ltd.), 224*
Grinding Machine, Cylindrical and Plunge (L. Loewe & Co. A.-G.), 343*
— — Face, 78-in. Hydraulic (Diskus-Werke A.-G.), 72*
— — Hydraulically-Operated (Fortuna-Werke A.-G.), 340*
— — Internal (Naxos-Union), 342*
— — Internal and Shoulder (Fortuna-Werke A.-G.), 340*
— — Roll (Churchill Machine Tool Co., Ltd.), 538*. See *Erratum*, 640
— — Thread (D. Brown & Sons (Huddersfield), Ltd.), 693*
Guillotine Shears, High-Speed Geared (Brookes (Oldbury), Ltd.), 226
Hack Saws, Graduated-Tooth Blades for ("Barsomator" Werkzeug G.m.b.H.), 518
— — Hand-Operated, Rail-Cutting (E. G. Herbert, Ltd.), 588*
Hobbing Machine, D.B.S. Worm Wheel (D. Brown & Sons (Huddersfield), Ltd.), 694*
Hydraulic Press. See *Press* (below)
Lathe, Capstan (A. Herbert, Ltd.), 374*
— D.B.S. Worm Wheel (D. Brown & Sons (Huddersfield), Ltd.), 694*
— 11-in. (Gebr. Bohringer G.m.b.H.), 341*. See *Erratum*, 408
— with Horizontal Capstan (Pittler Werkzeugmaschinenfabrik A.-G.), 375*
— Turret, Hydraulically-Operated (Magdeburger Werkzeugmaschinenfabrik A.-G.), 310*
— Wheel-Turning (W. Hegenscheidt A.-G.), 342*
Lidding Machine for Tins (Karges-Hammer A.-G.), 374*
Machine Shop Management. See *Works Management*
— Tool Exhibition, 1932, 609
— — Flange-Type Electric Motor for (British Thomson-Houston Co., Ltd.), 221*
— — Industry, Position and Prospects, 176
— — at Leipzig Fair, 309*
— — Trades' Association, Annual Dinner, 609
Milling Machine, Thread (D. Brown & Sons (Huddersfield), Ltd.), 693*
— — Direct Motor Driven (Wanderer-werke A.-G.), 374*
— — High-Power Plain (A. Herbert, Ltd.), 456*
— — Rolling-Mill Pinion (D. Brown & Sons (Huddersfield), Ltd.), 560*
— — Single-Lever Controlled (L. Loewe & Co. A.-G.), 183*
Nailing Machine, Box (Bohm und Kruse), 311*
Planing and Jointing Machine for Wood, 9-in. Hand-Feed (Wadkin & Co.), 748*
— Machine with Independent Cutting Drive (Etablissements C. Berthiez), 476*
— — 66-ft., Plate-Edge, Sydney Harbour Bridge Construction, 534*
Plate-Edge Planing Machine, 66-ft., Sydney Harbour Bridge Construction, 534*
Polishing and Buffing Set, Electrically Driven (W. Canning & Co., Ltd.), 223*
Press, Automatic Steatite (Steatite Magnesia Co.), 634*
— at British Industries Fair, Birmingham, 207
— High-Speed (Maschinenfabrik Weingarten vorm. H. Schatz), 374*
— Hydraulic, Boiler-Plate Flanging (Rice & Co. (Leeds), Ltd.), 14*
— — with Flexible Platen (Fluid Presses, Ltd.), 630*. See LETTER, 679. See *Addendum*, 703
— — 12-in. Three-Plate (Hollings & Guest, Ltd.), 206*
— — 120-ton Three-Plate (Tangyes, Ltd.), 207*
Rail-Cutting Hack Saw, Hand-Operated (E. G. Herbert, Ltd.), 588*
Reversing Gear, Electrical, for Planing Machines (Etablissements C. Berthiez), 476*
Roll-Grinding Machine (Churchill Machine Tool Co., Ltd.), 538*. See *Erratum*, 640
— 12-ft. Plate-Straightening, Sydney Harbour Bridge Construction, 534*
Saw Bench, 26-in. (Dominion Machinery Co., Ltd.), 211*
— See also *Hack-Saws* (above)
Scraper, Power-Operated (Alig & Baumgärtel), 519*
Screw-Thread Milling and Grinding Machines (D. Brown & Sons (Huddersfield), Ltd.), 693*
— — Rolling, 721*. See *Errata*, 766
Shaping Machine, Direct-Operated (J. Emrich G.m.b.H.), 309*
Shears, High-Speed Geared Guillotine, (Brookes (Oldbury), Ltd.), 226
Tapping and Drilling Machine, Automatic (L. Loewe & Co. A.-G.), 29*
Tins, Bottoming Machine for (L. Schuler A.-G.), 373*

Machine Tools—*continued.*

Tins, Lidding Machine for (Karges-Hammer A.-G.), 374*
Turret Lathes. See *Lathes* (above)
Wheel-Turning Lathe (W. Hegenscheidt A.-G.), 342*
Woodworker, Universal (Midland Saw and Tool Co., Ltd.), 295*
— — Electrically-Driven (Dominion Machinery Co., Ltd.), 210*
Woodworking Machinery, Combination Machine (Woodworking Machinery Co., Inc.), 688*
— — Dovetailing Machine (Bottcher und Gessner), 310*
— — 9-in. Hand-Feed Planing and Jointing Machine (Wadkin & Co.), 748*
— — 26-in., Saw Bench (Dominion Machinery Co., Ltd.), 210*
See also PARAGRAPH INDEX
Machine Work. See *Machine Tools*
Machinery Imports and Exports, Statistics, 20, 51, 82, 114, 145, 176, 229, 260, 289, 307, 777*
— Market in China, 289
Madrid, International Railway Congress. See *Railway Congress*
Machara, S., on Electric Power Enterprise in Japan, 92
Maffei Turbine Locomotive, 625
Magdeburger Werkzeugmaschinenfabrik A.-G., Hydraulically-Operated Turret Lathe, 310*
Magnesia Lagging for Steam Pipes, 579, 587, 650
Magnesite Bricks, Composition and Properties, 392
— Softening and Melting Points of, 390
Magnesium Alloys. See *Alloys* under *Metallurgy*
— Metallic, Properties of, 394
Magnetic Alloys, 219, 567*
— Master Compass, Holmes (H. Hughes & Son, Ltd.), 130
— Properties of Permalloy C, 567*
— Separator, Waterfall-Type (Rapid Magnetting Machine Co., Ltd.), 221*
— Tests, Silicon-Iron Alloys, 642, 654*
Mains, Electric. See *Cables* under *Electric*
Maize-Stripping Machine (Dubert & Serre), 431
Malcolm of Poltalloch, Col. E. D., the Late, 418
Malleable Cast Iron, Use in Belleville Water-Tube Boilers, 50
Management of Works. See *Works Management*
Manchester Association of Engineers, Annual Dinner, 261
— Barton Power Station Extension, Operating Results, 597*, 684*, 718*, 739, 745*
— Municipal College of Technology, Research Scholarships, 572; Summer Courses, 680
— Ship Canal, Heavy Road Traffic over Bridges, Lawsuit, 411; Traffic Statistics, 486
— Steam Users' Association, Explosion of Stirling Boiler, 577; Report, 673
Mandl Hydro-Electric Scheme, 815*
Manganese-Chromium Steels, Properties of, 749
Manitoba, Hydro-Electric Power Developments, 62
— Fort Churchill Harbour Works, 71
Mannaberg, M., the Late, 10
Manufacture, Scientific Methods in. See *Works Management*
Manumit Motor Roller, Power Unit for, 216*
Marconi's Wireless Telegraph Co., Ltd., Exhibits at Physical and Optical Societies' Exhibition, 129
Marège, France, Dordogne River Arch Dam, 578
Marine Auxiliary Machinery, Air Compressors, High-Pressure (G. & J. Weir, Ltd.), 506*
— — Machinery, Electric Windlasses, 483
— — Machinery, Evaporator with Continuous-Cleaning Mechanism (Clarke, Chapman & Co., Ltd.), 774*
— — Machinery, Vibration from, 529, 551*
— Boilers. See *Boilers*
— Engineering History, Chapters in, 333, 498, 690
— — Industry, Position and Prospects, 260
— — Lloyd's Statistics, 88, 513. See 56, 108
— — Progress in, 49
— — Scarcity of Students in, 482
— Engineers, Early, 498
— — Institute of, Annual Dinner, 351; Annual Report, 445; Advantages to Shipowners of Closer Co-Operation between the Naval Architect and Marine Engineer, by A. T. Wall, 482
— — and Naval Architects, American Society of. See *Naval Architects*
— Engines. See *Engines; Turbines; Marine Propulsion*
— Machinery, Output in 1929, 56, 108, 139. See 88, 513
— Propulsion, 200-h.p. and 100-h.p. British Kromhout Semi-Diesel Engines for Motor Tugs, 178
— — Condensers of H.M. Ships, 474*
— — Diesel-Electric Oil Tanker "Brunswick," Performance, 513, 519*
— — Diesel Engine, 2,750-h.p., with Büchi Supercharger, Trials of, 280*. See LETTERS, 325, 418
— — Diesel Engine Construction, Statistics, 185
— — 50,000-h.p. Diesel Engines, German Battleship "Ersatz Preussen," 175*
— — Diesel Engines, 20,000-a.h.p., Harland-B. & W. Type, M.S. "Britannic," 836*
— — Diesel Engines, 5,200-h.p., Harland-B. & W. Type, with Büchi Supercharger, M.S. "Dunbar Castle," 697
— — Diesel Engines and Steam Machinery, Operating Costs, 263
— — Diesel Engine for Tug "Irande," 106*
— — Economy in Marine Steam Machinery, 262
— — Geared Turbines and Turbo-Electric Drive, Comparisons, 263, 514
— — High-Pressure Steam for, 156
— High-Pressure Steam Installation, S.S. "Statendam," 491*, 513
Marine Propulsion, History of, 49
— — Machinery of S.S. "Berwindglen" and "Berwindyale," 262
— — Machinery of Ships Constructed on Great Lakes during War, 262
— — Machinery, Weights in Warships, 175*
— — Modern Steam Turbines, 263
— — and Power Plant Engineering, 156
— — Power Supply on Ships, 835
— — Pulverised Coal for, 237
— — Pulverised-Coal Installations, S.S. "Berwindglen" and "Berwindyale," 262
— — Pulverised-Fuel Installation, S.S. "Hororata," 343*
— — Steam and Oil Engines for Trawlers, 186
— — Steam Turbines, Single-Reduction Gearing for, 500*
— — Trials of Flotilla Leaders, 530, 568
— — Turbines, Exhaust-Steam, Bauer-Wach System, 139, 156
— — Turbo-Electric Liners for Peninsular & Oriental Steam Navigation Co., 139. See 513, 519*
— — Turbo-Electric Liner "Viceroy of India," Performances, 513, 519*
— — Vibration of Ships, Causes and Prevention, 529, 551*
— — U.S.S. "Saratoga," Trial Data, 263
— — See also *Engines; Turbines; Propellers; Ship Resistance;* and PARAGRAPH INDEX
— Structures, Deterioration in Sea Water, Report, 544
— Turbines. See *Turbines, Steam; Marine Propulsion*
Markets. See *Trade* and PARAGRAPH INDEX
"Maron," M.S., 2,750-h.p. Diesel Engine with Büchi Supercharger for, Trials, 280*. See LETTERS, 323, 418
Marshall, Sons & Co., Ltd., Exhibits at British Industries Fair, 216*
Marshalling Yards, Speed Control in, 724
Maryborough Substation, Southern Ireland Electricity Scheme, 731*
Maschinenfabrik Augsburg-Nürnberg, Diesel Engines for Hennigsdorf Substation, 411
Maschinenfabrik Weingarten vorm H. Schatz, High-Speed Press, 374*
Masonry Dams, Hydrostatic Uplift under, 181*, 235*
Mass Spectra, Aston's Work on, 397*, 437*, 470*
Massachusetts Institute of Technology, Experiments on Specific Volume of Steam, 258; Experiments on Earth Pressure, 689*, 753*
Master Compass, Holmes Magnetic (H. Hughes & Son, Ltd.), 130
Masts, Transmission Line, Southern Ireland Electricity Scheme, 731*
Materials, Strength of (Review), 163
— — See also *Stress* and *Tests* (*Materials*)
Matter, Transmutation of, 549*
Matthews, Sir T., the Late, 85
Maunsell, R. E. L., 4-4-0 Type "V" Class Passenger Locomotive, 408*
Mavor & Coulson, Ltd., Portable Belt Conveyor, 783*
Maxwell Scholarship, Faraday House, 200
May Lecture, Institute of Metals, Influence of Technique on Research, 640
Maybach, Dr. W., the Late, 41
Mayer, Dr. X., on High-Pressure Steam in Germany, 267
McKnight, C., on Nickel-Iron and Steel, 750
McLaren-Benz Airless-Injection Engine for Lorry, 169*; for Locomotive, 324*
McLaughlin, Dr. T. A., Southern Ireland Electricity Scheme, 731*, 743, 771. See *Erratum*, 767
Mc. See also *Mac*
Measures, Combined Metric Units, Conversion to British Units, 20
Measurements, Fine, and Gauges (Review), 806
Measuring Machine, Optical (C. Zeiss), 236*. See 285
Mechanical Engineering and Power Exhibition, New York, 55, 74*, 120*, 247*. See *Erratum*, 567
— Engineers, American Society of, Ring-Oiled Bearings, by G. B. Karelitz, 140*; Fiftieth Anniversary Meetings, 545

Mechanical Engineers, Institution of:

London Meetings, Winter Session:
Gray Lecture on Progress in Marine Engineering, by Engr. Vice-Admiral R. W. Skelton, 49
Election of Officers, 143, 291
General Operation Experiences with the First "Wood" Steam Generator, by E. W. Smyth, 149*. See 143, 177. See LETTER, 263
Annual Report, 290
Sixth Report of Steam Nozzles Research Committee, 291*, 296*, 361*. See 319, 329
Strength and Design of Fusion Welds for Unfired Pressure Vessels, by L. W. Schuster, 362*, 394*, 427*. See 349, 353, 382, 386*
Graduates' Lecture, on Science in Works Management, by W. Taylor, 383
Benevolent Fund Meeting, 416
Design and Results of a 600-lb. per square inch Boiler Installation, by W. Nithsdale, 406*. See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
Economical Production and Distribution of Steam in Large Factories, by F. Carnegie 585*, 618*. See 579, 650*
Grant of Royal Charter, 769
Value of Foreign Meetings, 801

North-Western Branch:
Discussion on Experiences with First Wood Steam Generator, 177. See 143, 149*. See LETTER, 263
Discussion on Sixth Report of Steam Nozzles Research Committee, 329. See 291*, 296*, 319, 361*
Discussion on Fusion Welds for Unfired Pressure Vessels by L. W. Schuster, 386*. See 349, 353, 362*, 382, 394*, 427*

Mechanical Engineers, Institution of—*continued.*

Operating Results with Recent Extensions at Barton Power Station, by H. L. Guy and H. C. Lamb, 597*, 684*, 718*. See 739, 745*
Discussion on Economical Production and Distribution of Steam in Large Factories, by F. Carnegie, 650*. See 585*, 579, 618*
Mechanical Lubricator. See *Lubricator*
— Stoker. See *Stoker*
— Traction on Roads. See *Roads; Motor Cars; Tractors*
Mechanics, Applied, Third International Congress, Stockholm, 450
— General, International Congress on, Liége, 1930, 143
Medemblik Pumping Station, Zuyder Zee Reclamation Works, 655*, 759. See LETTER, 743*
Meijer, Dr. W. M., on High-Pressure Steam Installation of Holland-America Liner "Statendam," 491*. See 513
Melting Points of Refractory Materials, 390
Merchant Shipbuilding. See *Shipbuilding*
— Ships. See *Ships; Steamers*
Mercury Arrester, High-Voltage, 93
— Inverter, 92
— Prices. See *Metal-Price Diagrams*
Metals, Anti-Friction. See *Alloys* under *Metallurgy*
— Corrosion of. See *Corrosion*
— Early Use of, 352
— Electron Theory of, 595
— Fatigue of. See *Alternating Stress* under *Tests* (*Materials*)

Metals, Institute of:

Zürich Meeting, 1931, 352
May Lecture on The Influence of Technique on Research, by Major F. A. Freeth, 640

Autumn Meeting, Düsseldorf, 1929
Properties of Locomotive Firebox Stays and Plates, by Dr. O. F. Hudson, T. M. Herbert, Dr. F. E. Ball and E. H. Bucknall, 30

Spring Meeting, London;
Programme, 270, 317
Report of Council, 352
Honorary Treasurer's Report, 352
Presidential Address, by Dr. R. Seligman, on the Work of the Institute, 352
Reports of Discussions, 352, 383, 398
Annual Dinner, 385
Early Use of Metals, by Dr. T. A. Rickard, 352
Macrostructure of Cast Alloys: Effect of Turbulence due to Gases, by R. Genders, 357*. See 353, 384
Unsoundness of Bronze Castings, by E. J. Daniels, 358*. See 384
Composition of Eutectics, by Dr. D. Stockdale, 383
Gases in Copper and their Removal, by W. S. Prytherch, 384
Influence of Gases on the Soundness of Copper Ingots, by N. P. Allen, 457*. See 384
Effects of Impurities on Copper, Part VI. The Effect of Phosphorus on Copper, by Prof. D. Hanson, S. L. Archbutt, and G. W. Ford, 522*. See 385. See *Erratum*, 436
Aluminium Brasses, by R. Genders, 554*, See 398
Diffusion of Zinc in Copper Crystals, by Dr. C. F. Elam, 398
Protective Value of Some Electro-Deposited Coatings, by L. Davies and L. Wright, 389*. See 398. See LETTER, 454
Zinc-Base Die-Casting Alloys, by R. Lancaster and J. G. Berry, 429*. See 399. See LETTER, 517
Atmospheric Action in Relation to Fatigue in Lead, by Prof. B. P. Haigh and B. Jones, 423*. See 399
Metallic Magnesium, by W. R. D. Jones, 394. See 400

Metals, Non-Ferrous, British Research Association, Investigation of Locomotive Firebox Stays and Plates, 30; Researches on Cast Copper and Bronze, 358*, 384, 457*, 522*
— Physical Properties of, Textbook (Review), 275
— Price Diagrams, 25*, 56*, 180*, 326*, 454*, 568*, 744*
— Researches on, Importance of Technique, 640
— Structure of. See *Metallography; Microphotographs*
— Welding. See *Welding*
— See also *Metallography; Metallurgy; Microphotographs*
Metallography of Ancient Egyptian Implements, 641
— See also *Metals; Metallurgy; Microphotographs*
Metallurgical Analysis, Select Methods (Review), 162

Metallurgy:

Alloys, Aluminium Brasses, Properties of 398, 554*
— — for Naval Engineering, 475
— Cast, Effect of Gases on Macrostructure, 357*, 384
— Composition of Eutectics, 383
— Copper, Age-Hardening of, 524
— — Properties of, 30
— — See also *Brass; Bronze; Gunmetal*, &c.
— Iron-Carbon, Carburising and Graphitising Reactions in, 642
— — Nickel-Chromium, Properties of, 641, 780*, 811*
— Lead, Fatigue Investigations, 399, 423*
— Magnetic and Electrical, 219. See 567*

Metallurgy—*continued.*
Alloys, Nickel-Chromium, Properties of, 641, 780*, 811*
— — Iron, Magnetic Properties, 567*. See 219
— Non-Ferrous, for Naval Engineering, 473*, 486
— Silicon-Iron, Constitution of, 642, 653*
— White Metals, Anti-Friction, 378
— — Metal Bearings, Value of, 23*
— Zinc-Base Die-Casting, Properties of, 399 429*. See LETTER, 517
Bessemer Steel, the Case for, 413. See LETTER, 517
Blast Furnaces. See *Furnaces*
Brass. See *Brass*
Bronze. See *Bronze*
Cast Iron. See *Cast Iron*
Coke Ovens. See *Coke Ovens*
Corrosion of Metals. See *Corrosion*
Cracking, Season, and Initial Stresses in Hard-Drawn Tubes, 65*
Foundry. See *Foundry*
Furnaces, Electric. See *Furnaces*
— Metallurgical. See *Furnaces*
Hardening Theory, History of, 450
Heat Treatment of Alloy Steels, 141. See 422
— — Annealing Furnace, 60-k.w. Electric (General Electric Co., Ltd.), 220*
— — Grünewald Bright-Annealing Process, 220, 442*
— — Hardening Tests, Steels Containing Chromium, 643, 680
— — Normalising and Box-Annealing of Steel Sheets, 583*, 610
Iron Manufacture. See *Furnaces, Blast* — Ore. See *Ore*
Magnesium, Metallic, Properties of, 394
Metals, Early Use of, 352
— Electron Theory of, 595
— Non-Ferrous, British Exports, 777*
— — Ferrous, British Research Association, Investigation of Locomotive Firebox Stays and Plates, 30; Researches on Cast Copper and Bronze, 358*, 384, 457*, 522*
— Physical Properties of, Textbook (Review), 275
— Researches on, Importance of Technique, 640
— Tests of. See *Tests (Materials)*
Metallurgical Analysis, Select Methods of (Review), 162
— Practice, Outline of (Review), 806
Metallurgy of Cast Iron (Review), 453
— Principles of (Review), 561
Nickel-Iron and Steel, Extended Use of, 750
Oxidation Tests on Alloy Steels, 682*
Pulverised Coal, Use in Metallurgy. See *Pulverised Coal*
Pyrometers. See *Pyrometers*
Refractories. See *Refractory Materials; Firebricks*
Rolling Mills. See *Rolling Mills*
Season-Cracking and Initial Stresses in Hard-Drawn Tubes, 65*
Steel, Bessemer, the Case for, 413. See LETTER, 517
— for Boiler Tubes, 473, 486
— Chromium-Copper, Structural, Properties of, 642, 687*
— — Manganese, Properties of, 749
— Containing Chromium, Properties of, 643, 680*
— Furnaces. See *Furnaces*
— High-Tensile, for St. Paul's Cathedral Restoration, 823
— for Naval Engineering, 473, 486
— for Rotors, Properties of, 421. See 141
— Specifications and Physical Properties, 749
Welding. See *Welding*
Zinc-Base Die-Casting Alloys, Properties of, 399, 429*. See LETTER, 517
— Doler, Properties of, 122
— Diffusion in Copper, 398
See also *Iron and Steel Institute; Metals, Institute of; Metallography; Microphotographs; Foundry;* and PARAGRAPH INDEX
eor, Siberian, Seismic and Aerial Waves Produced by, 669

Meteorological Society, Royal:
Symons Medal, Award to Dr. G. C. Simpson, 148
Weather Cycles and Weather Recurrences, by Sir R. Gregory, 148.
Electric Field of Overhead Thunderclouds, by Dr. S. K. Banerji, 669
Great Siberian Meteor and the Waves, Seismic and Aerial, it Produced, by F. J. W. Whipple, 669
Meteorology, United States Rainfall and Hydro-Electric Power, 124
— Weather Cycles and Weather Recurrences, 148
Metric Units, Combined, Conversion into British Units, 20
Metrology, Gauges and Fine Measurements (Review), 206
Metropolitan-Vickers Electrical Co., Ltd., High-Voltage Research Laboratory, 312*: 60,000 kv.-a. Transformers, Central Scotland Electricity Scheme, 600*; Switchgear, Central Scotland Scheme, 601*
Water Board, Pumping Installations of, 809*, 839*
— See also *London*
Michell Journal Bearings, Application of, 23*
— Thrust Bearings, Turbine-Driven Bore-Hole Pump, 714*
Michigan, University of, Investigation of Bearing Capacity of Clays, 639
Microphotographs, Bronze Casting, 359*
— Copper Ingots, 460*
— Instrument Pivots, 86*
— Oxidised Nickel Steel, 266*
— Silicon-Iron Alloys, 654*
— Zinc-Base Die-Casting Alloys, 399, 429*. See LETTER, 517
Microphotography, Demonstrations at Chelsea Polytechnic, 487
Microphotometer, Recording (Cambridge Instrument Co., Ltd.), 643
Microscope, Metallurgical (R. & J. Beck, Ltd.), 130
Microstructure of Grey Cast Irons, 643
— of Metals. See also *Metallography; Microphotographs*
Middlesbrough and Stockton, Imports of Iron and Steel, 478
Midgley and Boyd Bouncing-Pin Apparatus, Detonation in Petrol Engines, 44*
Midland Coke Research Committee, Coke-Shatter Test Apparatus, 745*
Midland Saw & Tool Co., Ltd., Universal Woodworker, 295*
Midsaw Universal Woodworker, 295*
Miller, L. H., on Steel House Construction, 749
Milligan, L. H., on Strength of Glass Containing Cracks, 196
Milling Machines and Cutters. See *Machine Tools*
Mills, Flax-Spinning, York Street, Belfast, Electrification of, 795*
— Grinding, Efficiency of, Report, 24
— Pulverised-Coal, Howden-Buell, S.S. "Hororata," 343*
— for Pulverised-Fuel Plant, 826*
— Rolling. See *Rolling Mills*
Milwaukee Power Station, Operating Results, 746*
Minerals in Central Australia, 479
— Applied Geophysics in Search for (Review), 39
— Oils. See *Oils*
— Production in New South Wales, 479
— Resources of Yunnan, China, 32
— World Consumption of, 836
— See also *Coal; Mining; Ores;* and PARAGRAPH INDEX
Mines, Coal. See *Collieries*
— Cable-Connecting Box for (G. Ellison, Ltd.), 223*
— Canadian Department of, Investigations of Fuels and Fuel Testing, 234
— Safety in, Research Board, Report on Relative Inflammability of Coal Dusts, 536
— Signalling from Cages in, 54
— United States Bureau of. See *United States*
— Use of Trolley Wires in, Regulations, 380
— Ventilation Problems in, 295, 536
— See also *Coal; Collieries; Mining; Ore,* and PARAGRAPH INDEX
Mining, Disrupted Strata (Review), 817
— Machinery, Explosion-Proof Electrical, Abnormal Pressures in, 477
— See also PARAGRAPH INDEX
Ministry of Transport. See *Transport*
Mint, Japanese Imperial, Osaka, 19
Mitre Gates, Welland Ship Canal Locks, 157*, 336*, 400*
Mitsubishi Shipbuilding & Engineering Co., Nagasaki, 20
Mitsuda, R., on the Mercury Inverter and a High-Voltage Mercury Arrester, 92; on Interference of Power Lines on Aerial Communication Lines and Radio Reception, 93
Mixing Machines, Concrete. See *Concrete*
— Vat Porcelain Insulator Manufacture, 633*
M.-L. Magneto Syndicate, Ltd., Rotary Transformer for Wireless Receivers, 130
Mocassin Creek Power House and Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
Model Beams, Nitro-Cellulose, Experiments on, 516
— Experiments. See *Aeronautics; Ship Resistance*
— Load, Three-Dimensional, and Current Tariffs, 835
— Plaster, for Stress Determination in Curved Beams, 231
— for Stress Determination. See *Optical*
— Thermodynamic, Surface of Nitrogen, 130
Modugno, Col. F., on the Discharge of Compressed Gases, 515
Moir, Sir E. W., on Engineering Difficulties, 238
Molybdenum, Effect on Nickel-Chromium Alloys, 812*
Monel Weir, Ltd., Exhibits at British Industries Fair, 225
Monkswell, Lord, on 4-8-2 Type Express Locomotive, Est Railway, 334*
Monoliths, Concrete, Welland Ship Canal Reconstruction, 242*
— Wall, Timber Shuttering for, Entrance Lock, Ymuiden, North Sea Canal, 68*
Monoplane. See *Aeronautics*
Monotron Hardness Indicator, 129, 252*
Mont Cenis Colliery, Linde Plant for Coke-Oven Gas Decomposition, 163*
Montreal, St. Hubert Airport, 842*
Mooring Posts, Welland Ship Canal, 242*
— Strain Indicator for Airships (Cambridge Instrument Co., Ltd.), 584*. See 273*
— Tower, Airship, Cardington, 271*. See 584*
— — Airship, St. Hubert, Montreal, 842*
Morgan, E., on Effect of Melting Conditions on Grey Cast Irons, 643
Mori, C., on Japan's Water Power, 92
Mori, H., on Electric Power in Japan, 92
Morita, K., on the Fusenko Hydro-Electric Power Plant, 92
Morris, H., Ltd., Petrol-Electric Runabout Crane, 208*
Morris, John, Memorial Prize, Salford Royal Technical College, 170
Mort, E. R., on Tin and Sheet-Mill Rolls, 615*. See 611
Mortar, Cement, Tensile Tests of, 67*
— Protection against Frost by Salts, 237
Moseley's Work on Ray Analysis, 372*
Moser, J., on Development of the Francis Turbine, 267
Moss Gear Co., Ltd., Planetary Reduction Gear, 13*
Motor Cars, Air Resistance of, 802
— Carbon Monoxide from, Risks of, 295
Motor Car Details:
Back Axles, Electrical Dynamometers for Testing, 438*. See 226
Engines. See *Engines, Petrol, Motor Car*
Gear Box, 7-ton Diesel-Engined Lorry, 169*
Gear Boxes, Electrical Dynamometers for Testing, 438*. See 226
Rear Axle, 7-ton Diesel-Engined Lorry, 169*
Spring Shackles, Silentbloc Flexible Bearing for (T. B. Andre & Co., Ltd.), 522*
— — Engineers. See *Automobile Engineers*
— — Engines. See *Engines, Petrol*
— — Fuels. See *Motor Fuels*
— — Gear Boxes. See *Motor-Car Details*
— — Manufacturers and Motor Taxation, 303*, 366
— — Parking Machine (Westinghouse Electric and Manufacturing Co.), 814*
— — See also *Motor Cycle;* and PARAGRAPH INDEX
— Carriages, Railway. See *Carriages*
— Cycle Industry, Position and Prospects, 114
— Electric, Hicycle, for Rotary Scaling Tools (Consolidated Pneumatic Tool Co., Ltd.), 63*. See *Erratum*, 79
— — Development in United States, 55
— — Explosion-Proof, Abnormal Pressures in, 477
— — Flange-Type, for Machine Tools (British Thomson-Houston Co, .Ltd.), 221*
— — Gate-Operating, Welland Ship Canal Reconstruction, 594*
— — for Industrial Purposes, 833
— — for Locomotives, 722
— — 900-h.p., Medemblik Pumping Station, 656*. See LETTER, 743
— — 4,600-h.p., for Reversing Rolling Mill, 104*
— — for Ships' Windlasses, 483
— — Single-Phase (Howell Electric Motors Co.), 248*. See *Erratum*, 567
— — 150-h.p., Squirrel-Cage, 797*
— — Three-Phase, Air-Break Starter for, 32*. See *Erratum*, 46
— — Three-Phase, Automatic Starter for (British Sousedik Electric Motors, Ltd.), 106*
— Fuels, Variable-Compression Research Set for, 44*
— Generator, 30-h.p., Electroplating Set (Electrical Power Engineering Co. (Birmingham), Ltd.), 224*
— Industry, Position and Prospects, 82, 114
— Internal-Combustion. See *Aeronautics; Engines; Motor Cars; Tractors*
— Lorry, 7-ton, with 70-h.p. Diesel Engine (Kerr, Stuart & Co., Ltd.), 169*
— — High-Lift Tipping Gear for (Bromilow & Edwards, Ltd.), 618*
— — Wheels, Impact Reactions of, 69, 95
— — See also *Motor Wagons*
— Marine. See *Engines; Marine Propulsion; Motor Ships*
— Omnibuses and Railless-Electric Vehicles, Relative Advantages, 228
— Paraffin. See *Engines, Oil*
— Petrol. See *Aeronautics; Engines, Petrol; Motor Cars; Tractors*
— Roller, Manumit, Power Unit for, 216*
— Spirit. See *Motor Fuel*
— Taxation, British, Influence on Petrol Engine Design, 303*, 366. See LETTERS, 776, 808
— Tractors. See *Tractors*
— Traffic, England and Wales, 1928, Statistics, 414
— Transport in Germany, 709
— — and Railway Competition, 708
— — in United States, 708
— Tug "Irande," for the Thames, 106*
— — Thames, Haarlem Shipbuilding Co., 178
— Vehicles, Imports and Exports, 82, 777*
— — at Leipzig Fair, 340
— — Springs, Laboratory and Road Tests, 26*
— — and Tractors (Review), 162
— Wagon, Sentinel, with Paris Concrete Mixer, 631*
— — See also *Motor Lorries; Tractors*
Motorenfabrik Deutz A.-G., High-Speed Airless-Injection Oil Engines, 409*
Motorship "Akagisan Maru," Performance of, 186
— "Britannic," White Star Line, 836*
— "Brunswick," Diesel-Electric Drive, Performances, 513, 519*
— under Construction, Lloyd's Statistics, 88, 513
— "Dunbar Castle," 697*
— "Grainmotor," Machinery of, 124
— Launched, Annual Statistics, 166
— "Llangibby Castle," Gravity Davit and Winch, 668*
— "Maron," 2,750-h.p. Diesel Engine with Buchi Supercharger for, Trials of, 280*. See LETTERS, 323, 418
— and Oil-Burning Steamers, Comparisons, 186. See 263
— Power Supply on, 835
— and Steamers, Operating Costs of Engine Departments in, 263. See 186
— Vibration in, Causes and Prevention, 529, 551*
— See also *Marine Propulsion*
Mould Dressings, Effect on Cast Alloys, 357*, 384
Mowing Machine, 5-h.p. Motor-Driven (Dollé), 434
Multiport Back-Pressure Steam Valve (Cochrane Corporation), 120*
Multitubular Boilers. See *Boilers*
Municipal Electric Power Supply, 698
— Electrical Association, Incorporated, Eastbourne Meeting, Programme, 572; Presidential Address on Electricity Supply, by J. K. Brydges, 698; Obligations of Electricity Committees to Municipal Electricity Undertakings, by R. S. Chatfield, 698; Pulverised Fuel as Affecting Economic Boiler House Operation, by G. H. Lake, 740; Electric Heating of Buildings, by J. W. Burr, 741
— Electricity Undertakings and Electricity Committees, 698
Murgatroyd, J. B., on Annealing Schedules for Commercial Glassware, 195
Murray Fin Tubes in "Wool" Steam Generator, 143, 149*
Murray, M., Memorial to, 578
Museum, Engineering, Proposed, at Newcastle-on-Tyne, 261

N.

NAG HAMADI Barrage, River Nile, Construction, Cableways, 252.
Nägel, Dr. A., on the Diesel Motor in Germany, 185
Naito, A., on Soft Coal as Domestic Fuel in Japan, 184
Nalder Brothers & Thompson, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 129
Nanjo, K., on Transportation and Distribution of Coal in Japan, 183
Nash, Prof. A. W., on Synthetic Fuels and Lubricating Oils, 184
Nash Safe-Load Indicators, Ltd., Safe-Load Indicator for Cranes, 807*
National Electricity Supply, 481
National Gas Engine Co., Ltd., Exhibits at British Industries Fair, 206
— Physical Laboratory, Experiments on Laminated Springs, 26*; Froude Experimental Tank, Research-Fund Appeal, 323; Investigation of the Effects of Phosphorus on Copper, 522*. See 385 & *Erratum*, 436; Alloys of Iron Research, 642, 653*; Investigation of Nickel-Chromium and Complex Iron-Nickel-Chromium Alloys, 641, 780*, 811*; Exhibits at Royal Society Conversazione, 675; Variable-Density Wind Tunnel, 808*; Report of Executive Committee, 814
— Safety Week, 513
— Union of Students, Appeal for Funds, 411
Natural Gas, Re-Forming in Water-Gas Generators, 679.
Naval Architects, Co-Operation with Marine Engineers, 482

Naval Architects, Institution of:
Spring Meeting, London:
Programme, 419
Report of Council, 484
Election of Officers, 484
Annual Dinner, 486
Reports of Discussions, 485, 513, 529
Presidential Address by Lord Wester Wemyss, 484
Safety of Life at Sea (1929 Conference), by Sir W. S. Abell and A. J. Daniel, 489*. See 485
Materials Used for Naval Engineering Purposes, by Engr.-Capt. J. H. Harrison, 473*. See 486
Recent Results Obtained in Service with the High-Pressure Steam Installation of the Holland-America Liner "Statendam," by Dr. W. M. Meijer, 491*. See 513
Performance of Two Vessels with Electric Transmission Gear, by W. J. Belsey, 519*. See 513
Final State of a Gas Discharged from a Reservoir into a Space under Constant Pressure, by Col. F. Modugno, 515
Behaviour of Two Passenger Vessels during a Voyage to and from Australia, by Dr. B. C. Laws, 515. See LETTER, 572
Stability of a Vessel with a List, by F. H. Alexander, 515
Stress Distributions in Notched Beams, and their Application, by Prof. E. G. Coker and G. P. Coleman, 516
Causes and Prevention of Vibration in Motorships, by R. Sulzer, 551*. See 529
Vibration of Ships, by Dr. J. L. Taylor, 529
Sea Trials of Flotilla Leaders, by Lieut.-Col. F. Dondona, 530. See 563.
Experiments on the Resistance and Form of Towed Barges, by G. S. Baker and E. M. Keary, 531
Ship Wave Resistance: Some Further Comparisons of Mathematical Theory and Experimental Result, by W. C. Wigley 532
Naval Architects and Marine Engineers, American, Society of, Work of Great Lakes Shipyards in the World War, by H. Penton, 262; Great Lakes Bulk-Freighters, by W. Bennett, 262; Colliers "Berwindglen," and "Berwindyale," by J. E. Burkhardt, 262; Economy in Marine Steam Machinery, by J. H. King, 262; Modern Marine Propulsion, by W. E. Thau, 263; Operating Costs of Engine Departments of U.S. Shipping Board, Diesel and Steam Cargo Vessels, by Capt. R. D. Gatewood, 263; Safety of Life at Sea, by Rear-Admiral G. H. Rock and Rear-Admiral J. G. Tawresey, 263; Corrosion-Resisting Steel and Its Application to Ships, by Comdr. H. E. Saunders, 263; Trial Trip Data of U.S.S. "Saratoga," by Lieut.-Comdr. J. T. Alexander, 263; Model and Full-Size Tests of a Single-Screw Merchant Vessel, R. R. Adams, 263
— Architecture, Scarcity of Students in, 482
— — Stability of Listed Vessels, 515
— — See also *Warships*
— Construction, Director of, History of Office, 33
— — See also *Warships*
— Constructors, Royal Corps of, Annual Dinner, 199
— Engineering History, Chapters in, 333, 498, 699
— — Materials Used in, 473*, 486
— — Progress in, 49
— Limitations, Treaty of, 575
— Powers, Cruiser and Destroyer Strength, 111

Naval and Shipping Annual, Brassey's (Review), 500
— Warfare. See *Warships*
— See also *Warships*
Navigation, Direction-Finding, Investigations by Radio Research Board, 467
— Echo-Sounding Equipment, 129
— Steam, Early History of, 333, 498, 690
— Thomas Gray Prizes in, 454
Navy, British. See *H.M.* under *Warships*
— German, Battleship "Ersatz Preussen," 175*
— Italian, Trials of Flotilla Leaders, 530, 568
— United States. See *United States* under *Warships*
— See also *Naval; Warships;* and PARAGRAPH INDEX
Naxos-Union, Internal-Grinding Machine, 342*
Needle Valves, Coolidge Multiple-Dome Dam, 370*
Neemes Foundry, Inc., Boiler Furnace Dumping Grate, 122
Negretti & Zambra, Exhibits at Physical and Optical Societies' Exhibition, 130.
Neu, L., on Refrigerating Plant for Turbo-Generators, 268; on Utilisation of Wind Power, 268
Neutralisers, Sulphate, Becker Coke-Oven Plant, Sheffield, 699*
New Brunswick, Saint John Harbour Extension, 720
— South Wales Irrigation Scheme, 251
— — Wales, Mineral Production in, 479
— — Wales, Walsh Island Dockyard, Floating Dock for, 283*. See *Addendum*, 410
— Year's Honours List, 18
— York Building Congress, Work of, 706
— — East River Power Station, Water-Tube Boiler, Record Performance, 137
— — Financing of Bridge Construction in, 113
— — Jubilee Meeting, American Society of Mechanical Engineers, 545
— — Power and Mechanical Engineering Exhibition, 55, 74*, 120*, 247.* See *Erratum*, 567
— Zealand, Arapuni Hydro-Electric Scheme, Hydraulic Jet Dispersers, 137*
— — Imports and Exports, 57
— — Lyttelton Harbour, Development of, 332
New Zealand Shipping Co., Ltd., S.S. "Hororata," Pulverised-Fuel Installation, 343*
— — Wellington Harbour, 779
Newcastle-upon-Tyne Electric Supply Co., Ltd., Dunston Power Station, Low-Temperature Distillation Experiments, 184
— — North-East Coast Exhibition, Disposal of Buildings, 201
— — Proposed Engineering Museum at, 261
Newcomen Society, Pioneer Ships of the Atlantic Ferry, by Engr.-Capt. E. C. Smith, 298
Newton, Chambers & Co., Ltd., Steelwork, Becker Coke-Oven Plant, Sheffield, 699*
Nickel-Chromium Alloys, Properties of, 641, 780*, 811*
— — Steels, Properties of, 643, 680*
— Electro-Deposited, Protective Value of, 389,* 398
— Electroplating, Stopping-Off Materials for, 536
— Iron Alloys, Magnetic Properties of, 567*
— — and Steel, Extended Use of, 750
"Nicoloso da Recco," Italian Flotilla Leader, 568. See 530
Nigeria Public Works Department, Report, 114
Nigerian Electricity Supply Corporation, Ltd., Hydro-Electric Power Plant, 24
Nile, River, Assouan Dam, Heightening of, 101*; Sluice Discharge, 23
— — Nag Hamadi Barrage, Construction, Cableways, 252
Nishitama Works, Asano Portland Cement Co., 18
Nithsdale, W., on a High-Pressure Boiler Installation, 406,* See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
Nitrogen, Effect on Copper and Bronze, 358*, 384. See 457*
— Model of Thermodynamic Surface, 130
— and Oxygen from Air, Linde Process, 163*
— Production from Coke-Oven Gas, Mont Cenis Colliery, 163*
Noetzli, Dr. F. A., on the Coolidge Multiple-Dome Dam, 193,* 276,* 368*; on Laminated Arch Dams with Forked Abutments, 578
Nomograph for Surveyors (Cooke, Troughton & Simms, Ltd.), 315
Non-Conducting Coverings. See *Heat Insulation*
— Ferrous Metals. See *Metals; Metallurgy*
Norbury, Dr. A. L., on Effect of Melting Conditions on Grey Cast Irons, 643
Norris, Henty and Gardners, Ltd., Oil-Driven Generator and Air-Compressor Set, 204*
North-East Coast Exhibition, Newcastle-upon-Tyne, Disposal of Buildings, 201
— — Coast Institution of Engineers and Shipbuilders, Powdered Coal for Ship Propulsion, by Engineer Rear-Admiral W. S. Hill, 287; Report on Engineering Training for Officers' Rank, 488; Ships' Electric Deck Auxiliaries, by A. Read, 483
— — England Electricity Scheme, Government Assistance for Frequency Standardisation, 143
North-Eastern Marine Engineering Co., Ltd., 2,750-h.p. Marine Diesel Engine with Büchi Supercharger, Trials, 240*. See LETTERS, 323, 418
— Mimms Pumping Stations, Turbine-Driven Pumping Plant, 751*
— Notes from, 15, 47, 79, 108, 139, 170, 201, 254, 285, 316, 346, 378, 410, 445, 479, 509, 540, 573, 605, 637, 671, 703, 735, 766, 799, 829. See PARAGRAPH INDEX
— Sea Canal, Ymuiden Entrance Lock, 3*, 67*
— Shields, Tyne Commission Quay, 332
— Western Railway, India, Reconstruction of Attock Bridge, 503
Northern Chromium Co., Ltd., Electrical Thermal Storage Plant, 94*
— Coke Research Committee, Annual Report, 590
Notched-Bar Tests. See *Tests* (*Materials*)
— Beams, Stress Distribution in, 516
Notes on New Books. See *Books* and LITERATURE INDEX
— See *Cleveland; North; South-West; South Yorkshire; Labour;* See also PARAGRAPH INDEX
Nova Scotia, Hydro-Electric Power Developments, 62
Nozzles, Flow from, and Coefficients of Discharge, 803
— Steam Turbine, Report on Research, 291* 298*, 361*. See 319, 329

O.

Obituary:
Alabaster, H., 105
Allan, P., 826
Anderson, J. W., 635
Arnold, Prof. J. O., 450*
Balfour, Earl of, 415
Baynes, S. W., 200
Brown, W., 10
Caillard, Sir V. H. P., 418
Callendar, Prof. H. L., 115*
Dixon, W., 147
Ferranti, Dr. S. Z. de, 84*
Field, M. B., 346
Fowler, A. F., 78
Gracie, Sir A., 316
Hide, W. D., 138
Hoy, Sir W., 254
Longbottom, Sir B., 604
Malcolm of Poltalloch, Col. E. D., 418
Mannaberg, M., 10
Matthews, Sir T., 85
Maybach, Dr. W., 41
Penny, L., 24
Petrie, Dr. P. T., 697
Rateau, Prof. A., 86. See LETTER, 178
Raworth, J. E., 670
Sinclair, D., 636
Sperry, E. A., 803*
Swinton, A. A. C., 293
Unwin, M. E., 568
Waddell, W., 604
Zweigbergk, T. von., 418
Oerlikon Co., Optical Examining Apparatus for Rotors, 423*
Oertling, L., Ltd., Exhibits at Physical and Optical Societies' Exhibition, 129
Oester Dam, Ruhr River, Duisburg, Uplift Diagram, 182*
Officers' Rank, Engineering Training for, Report, 448
Ofverholm, I., on Electrification of Swedish State Railways, 117
Ogura, K., on Municipal Electric and Gas Enterprise in Japan, 92
Ohio Fuel Co., Experiments on Re-Forming Natural Gas, 679
Ohio Insulator Co., Equipment for Artificial Lightning Tests, 455*
Oil Consumption for Power Purposes in Japan, 184
— Electric Heat-Storage System (Browns Dryers, Ltd.), 493
— Engines. See *Engines, Oil; Motor Cars; Tractors*
— Fuel Heating for Tin and Sheet-Mill Rolls, 611, 615*
— Industry, Californian, Fatalities in, 324
— Lubricating, Synthetic Production of, 184
— Motors. See *Engines, Oil; Motor Cars; Tractors*
— Separator, Marine Type, De Laval, 199*
— Switches. See *Switchgear.*
— Tractors. See *Tractors*
— Well Deviation, Prevention and Correction, 699
— See also *Lubrication; Petroleum*
Olberg, Major C. R., Coolidge Multiple-Dome Dam, 193*, 276*, 364*
Oleo-Pneumatic Shock Absorber for Aeroplanes (Blackburn Aeroplane and Motor Co., Ltd.), 647*
Olympia, Empire Hall, 166
— See also *Exhibition*
Omnibus, Motor. See *Motor Omnibus*
Onnes, K., Work of, 640
Ontario, Sault Ste. Marie, Electro-Metallurgical Plant at, 256
— Hydro-Electric Power Commission, Testing Department, 669
— — Electric Power Developments, 62
Open-Hearth Furnace. See *Furnace*
Operating Machines, Gate and Sluice, Welland Ship Canal Reconstruction, 402*, 594*, 663*, 728*
Optical Apparatus, Physical and Optical Societies' Exhibition, 52*, 86*, 128*, 323, 343
— — for Talking-Film Production, 823
— Determination, Stresses in Notched Beams, 516
— Examining Apparatus for Rotors, 423*
— Measuring Machine (C. Zeiss), 236*. See 285
— Pyrometers. See *Pyrometers*
— Society, Exhibition of Apparatus, 52*, 86*, 128*, 323, 343
Optics, English Instrument Makers of the Eighteenth Century, 772
— Photo-Electric Refractometer (Bellingham & Stanley, Ltd.), 128
— Spectrographic Apparatus (A. Hilger, Ltd.), 52
Ordnance Factories, Woolwich, Production and Distribution of Steam in, 585*, 579, 618*, 650*
Ore Concentration, Centrifugal, Experiments on, 775
— Dressing of (Review), 192
— and Gases, Interaction in Blast Furnaces, 609, 647*
Orenstein und Koppel A.-G., Oil-Driven Locomotive, 376*
Organic Chemistry. See *Chemistry*
Orrok, G. A., on Economics of Water *versus* Steam Power, 122; on High Pressures and Temperatures in Power Generation, 299
Osaka, Japanese Imperial Mint, 19
O'Shaughnessy, M. M., Hetch Hetchy Water Supply, San Francisco, 125*
Otsuka, E., on Japanese Funicular Railways, 117
Otway, Lieut. R., Writings on Steam Navigation, 499
Ovens, Bakers', Steam-Heated, Explosions of, 453, 493
— Coke. See *Coke Ovens*
Overhead Cranes. See *Cranes*
— Lines, Power Transmission, Central Scotland Electricity Scheme, 603*
— — Power Transmission, Effect of Lightning, 93
— — Power Transmission, Hetch Hetchy Water Supply, San Francisco, 127*
— — Power Transmission, Inductive Interference from, 93, 351
— — Power Transmission, Testing Equipment for Towers, 88
Overseas Trade Department, Report, Economic and Trade Conditions in Australia, 228; Report, Economic Conditions in China, 288; Report, Economic Conditions in Argentine Republic, 447. See LETTER, 517; Report, Economic Conditions in East Africa, 512; Report, Economic Conditions in Austria, 674; Report, Economic Conditions in Poland, 770
Oxidation Tests on Alloy Steels, 682*
Oxy-Acetylene Welding. See *Welding*
Oxygen, Atomic Weight of, 437
— Effect on Copper and Bronze, 358*, 384, 457*
— and Nitrogen from Air, Linde Process, 163*
— Use for Divers, 259

P.

PADIHAM Power Station, Data and Operating Results, 299, 746*
Page, A. R., on Steels Containing Chromium, 680*. See 643
Page, Sir A., Central Scotland Electricity Scheme, 599*
Paint Protection against Corrosion, Experiments on, 545
— Vandyke Brown, Standard Specification, 509
Palestine, Harbour Construction at Haifa, 638
Palmer, Sir F., Tilbury Passenger-Landing Stage, 678*
Palmers Shipbuilding & Iron Co., Ltd., H.M. Destroyer "Boreas," Launch, 798
Panama Canal, Annual Report, 230
Paper Manufacture in Tasmania, 479
Paradox, Hydraulic, Mean Speed of a Jet, 803
Paraffin Engines. See *Engines, Oil*
— Tractors. See *Tractors*
Paris Agricultural Machinery Exhibition, 431
— Lyons & Mediterranean Railway, 5,400-h.p. Electric Locomotive, Tests, 793
— Orleans Railway, Concrete Sleepers on, 660
— Transit Concrete Mixer (British Steel Piling Co., Ltd.), 631*
Parker, F., Ltd., Concrete Mixers, 226
Parking Machine, Motor-Car (Westinghouse Electric and Manufacturing Co.), 814*
Parmoor, Lord, on Research in Building, 707
Parsons, C. A., & Co., Ltd., 15,000-kw. Steam Turbines, Lots Road Power Station, 443
Parsons, H. de B., on Hydrostatic Uplift under Masonry Dams, 181*, 235*
— Turbine. See *Turbines, Steam; Marine Propulsion*
Partridge, Dr. J. H., on Glass-House Refractories, 525; on Steels Containing Chromium, 680*. See 643
Patent Record, 64*, 240*, 302*, 430*, 464*, 526*, 558*. See PATENT RECORD INDEX
Patentees, Institute of, Scholarship in Science, Engineering and Metallurgy, 387
Pavilion, Aluminium, Liége Exhibition, 829
Pawlowski, F. W., on Wind Resistance of Motor Cars, 802
Payment of Labour. See *Labour*
Peace River and Vancouver Railway, Proposed, 255
Pearson & Knowles Coal and Iron Co., Ltd., Replacement of Railway Bridge, Liverpool, 696*
Penetration Railways, 662
Peninsular and Oriental Steam Navigation Co., Turbo-Electric Liners, 139; S.S. "Viceroy of India," Performances, 513, 519*
Pennsylvania Railroad and Road Competition, 708
Penny, L., the Late, 24
"Pensilva," S.S., Explosion of Stop Valve, 493
Pension Scheme, Lancashire Electric Power Co., Ltd., 487
Penton, H., on War Work of Great Lakes Shipyards, 262
Percha Dam, Rio Grande, New Mexico, Uplift Diagram, 235*
Percy, Lord E., on Education and Training in Building Trade, 707
Permalloy C., Magnetic Properties of, 567*
Perman & Co., Ltd., British Kromhout Semi-Diesel Engines for Motor Tugs, 178
Permanent-Way Equipment of Light Railways, 786
— — Tools, Improvements in, 787
Perth, Western Australia, Water Supply of, 484
Petrie, Dr. P. T., the Late, 697
Petrol, Gas-Enriching, 148
— Motors. See *Aeronautics; Engines, Petrol; Motor Cars; Tractors*
— Tractors. See *Tractors*
Petroleum Industry, Californian, Fatalities in, 324
— Resources of Japan, 184
— Technologists, Institution of, Oil-Well Deviation, by D. P. Rees, 699
— See also *Oil; Paraffin; Engines, Oil*
Petters, Ltd., 195-h.p., Three-Cylinder Two-Stroke Oil Engine, 205*; Compression Cylinder Ring for Two-Stroke Engines, 205*; Controller and Starter for Lighting Sets, 205
Phillips Petroleum Co., Gas-Enriching Petrol, 148
Phillips, Prof. A., on X-Ray Studies of Cupped Copper, 61*
Philo Power Station, Data and Operating Results, 299, 746*
Phosphorus, Effect on Copper, 385, 522*. See *Erratum*, 436
Photo-Elasticity. See *Optical Determination of Stress*
Photometer, Micro-, Recording (Cambridge Instrument Co., Ltd.), 643
Photomicrographs. See *Microphotographs*
Physical Apparatus, Physical and Optical Societies' Exhibition, 52*, 86*, 128*, 323, 343
— Chemistry. See *Chemistry*
— Laboratory. See *National Physical*
— Research in Wireless, 805
— Society, Exhibition of Apparatus, 52*, 86*, 128*, 323, 343
— Space and Ether Problems, 805
Physics, Atomic Nuclei and their Structure, 371*, 397*, 437*, 470*
— Critical Point of Water, 1*. See 88*
— Electron Theory of Metals, 595
— Institute of, Presidential Address, by Dr. W. H. Eccles, on Physical Research in Wireless, 805
— Investigation of Isotopes, 461*
— Mass Spectra, Aston's Work on, 397*, 437*, 470*
— Molecular Structure of Cellulose, 525*
— Properties of Steam, American Researches on, 257
— Ridge Formation in Sounding Tubes, 676
— Spectrographic Analysis, Raies Ultimes Powders for, 52
— — Apparatus (A. Hilger, Ltd.), 52
— Television, Present and Future, 343
— Thermodynamic Surface of Nitrogen, Model of, 130
— Transmutation of Matter, 549*
— See also PARAGRAPH INDEX
Physiological Aspects of Diving, 259
— Problems in Mine Ventilation, 295
Piano Player, Portable, Wearham, 180
Pierheads, Entrance Lock, Ymuiden, North Sea Canal, 6*, 67*
Pig-Iron Prices. See *Metal-Price Diagrams*
Pile-Driving Plant, Adelaide Harbour (British Steel Piling Co., Ltd.), 57*
— Foundations, Ferro-Concrete, Entrance Lock, Ymuiden, North Sea Canal, 6*
Piling, Steel Sheet, Zuyder Zee Reclamation Works, 762* 821*
Pinhook Dam, Maguoketa River, Iowa, Uplift of, 235*
Pinions. See *Gears; Gearing; Marine Propulsion*
Pintles, Gate, Welland Ship Canal Reconstruction, 338*
Pipe Bends, Hydraulic Losses in, 268
— — Stiffness of, 579
— Joints, Flexible (Barco Manufacturing Co.), 250
— Lead, Creep Tests of, 328, 772*
— Steam. See *Steam Pipes*
— Welded Joints in, 362, 386
— See also *Tubes*
Piston Speed, Motor-Car Engines, 366
Pit-Prop, Steel, Adjustable, Craggs-Plummer, 212*
Pittler Werkzeugmaschinenfabrik A.-G., Lathe with Horizontal Capstan, 375*; Air-Operated Chuck, 376*
Pivots, Instrument (Everett, Edgcumbe & Co., Ltd.), 86*
Planetary Reduction Gear (Moss Gear Co., Ltd.), 13*
Planimeter (G. Kent, Ltd.), 52*
Planing Machine. See *Machine Tools*
Planting Machine, Bajac, 431
Plaster Models, Stress Determination in Curved Beams, 231
Plate-Edge Planing Machine. See *Planing Machine* under *Machine Tools*
— Shearing Machine. See *Machine Tools*
— Steel, Prices. See *Metal-Price Diagrams*
Plating, Electro. See *Electro*
Plough, Motor. See *Tractor*
Ploughing Tackle at Paris Agricultural Machinery Exhibition, 431
Plugs and Sockets, Standard Specification, 752
Plummer Blocks, Roller-Bearing (Ransome and Marles Bearing Co., Ltd.), 462*
Pneulec, Ltd., High-Speed Swing-Frame Grinder, 224*
Pneumatic Tools. See *Machine Tools*
— See also *Compressed Air; Air Compressor*
Pohlig, J., A.-G., Aerial Coal Transporter with Travelling Tower, 629*
Poisson's Ratio, Determination by Lateral Extensometers, 465*
Poland, Coal Wages in, 680
— Economic Conditions in, 770
Polarised Light. See *Optical Determination of Stress*
Pollution, Atmospheric, Report on, 825
Polytechnic. See *Education*
Pontoons, Towing Experiments with, 531
Poplar School of Engineering and Navigation, Lectures on High-Tension Electricity, 148
Porcelain Insulators, Manufacture of, 632*
Port of Amsterdam, Entrance Lock, North Sea Canal, 3*, 67*
— of London, Tilbury Passenger-Landing Stage, 678*
— of New York Authority and Bridge Construction, 113
— and Railways, Relations between, 658
— of Rangoon, Annual Report, 231
Portable Engine. See *Engine*
— Machine Tools. See *Machine Tools*
Portishead Power Station, Circulating-Water Culverts, 433*
Portland Cement. See *Cement*
Portobello Power Station, Edinburgh, Extension, 715
Posts, Mooring, Welland Ship Canal, 242*
Post Office, Investigations on Interference with Broadcast Reception from Tramways, 250
— — Telephone Charges at Surbiton, 416
Potash Storage and Shipment Plant, Antwerp, 305*, 365*

Powdered Coal. See *Pulverised Coal*
Power Conference, World. See *World Power Conference*
— Electric, Balancing Supply and Demand, 93
— — Influence of Load Factor, 92, 122*
— — in United States, Statistics, 124
— Generation, High Pressures and Temperatures in, 299
— and Mechanical Engineering Exhibition, New York, 55, 74*, 120*, 247*. See *Erratum*, 567
— Plant Engineering and Marine Propulsion, 156
— — Hydro-Electric, Arapuni, New Zealand, Hydraulic Jet Dispersers for, 137*
— — Hydro-Electric, Canadian, Statistics, 536
— — Hydro-Electric, Churchill River, Canada, 442
— — Hydro-Electric, Chute à Caron, Quebec, Canada, 323
— — Hydro-Electric, Cost of Energy per Kilowatt-Hour, 122*
— — Hydro-Electric, Development in British Columbia, 829
— — Hydro-Electric, Development in Canada, 62, 829
— — Hydro-Electric, Fusenko, Korea, 92
— — Hydro-Electric, Inawashiro and Kiso River, Japan, 19
— — Hydro-Electric, in Japan, 92
— — Hydro-Electric, Japanese, Reservoirs for, 267
— — Hydro-Electric, Mandi, North India, 815*
— — Hydro-Electric, Nigeria, 24
— — Hydro-Electric, Ontario Hydro-Electric Power Commission, Testing Department, 669
— — Hydro-Electric, Pumped-Storage, Rocky River, Connecticut, 35*, 97*
— — Hydro-Electric, Säckingen, Germany, 32,500 kv.-a. Alternator, 743*
— — Hydro-Electric, Shannon, 731*, 743, 771. See *Erratum*, 767
— — Hydro-Electric, Shinano-Gawa, Japan, 154
— — Hydro-Electric, St. Francis River, Quebec, 147
— — Hydro-Electric and Steam, Joint Operation in Japan, 154
— — Steam and Electric, Progress in United States, 55
— — Steam and Hydro-Electric, Joint Operation in Japan, 154
— — Steam, Royal Ordnance Factories, Woolwich, 585*, 579, 618*, 650*
— — Steam, Ruths Accumulators in, 155. See 764*
— — See also *Power Stations ; Power, Water ; Substations*
— Press. See *Machine Tools*
— for Ship Propulsion. See *Marine Propulsion ; Ship Resistance*
— Stations, Canadian, Use of Diesel Engines in, 124
— — Dunston, Low-Temperature Distillation at, 184
— — East River, New York, Water-Tube Boiler, Record Performance, 137
— — Electric, Barton, Manchester, Operating Results, 597*, 684*, 718*, 739, 745*
— — Electric, Central Scotland Electricity Scheme, 599*
— — Electric, Charlottenburg, Ruths Accumulators, 155, 764*
— — Electric, East England Electricity Scheme, 667*
— — Electric, Engine-Room Telegraph, 392*
— — Electric, Generation of Super-Pressure Steam, 58*
— — Electric, German, High-Pressure Steam in, 267
— — Electric, Holland, Practice in, 267
— — Electric, in Japan, 92
— — Electric, Kingston-on-Thames, Extension, 503
— — Electric, Kirkstall Road, Leeds, Engine-Room Telegraph, 392*
— — Electric, Lots Road, London, Reconstruction of, 443*
— — Electric, Portishead, Circulating-Water Culverts, 433*
— — Electric, Portobello, Edinburgh, Extension, 715
— — Electric, Progress in United States, 55
— — Electric, Pulverised Fuel in, 740
— — Electric, South West England and South Wales Electricity Scheme, 119*
— — Electric, Southern Ireland Electricity Scheme, 731*, 743, 771. See *Erratum*, 767
— — Electric, Steam, Cost per Kilowatt, 122*
— — Electric, Sulphurous Fumes from, 741
— — Electric, Super-Pressure, Billingham, 350
— — Electric, in United States, 92, 299, 746*
— — Electric, United States, Thermal Efficiency, 154
— — Electric, York Street Mills, Belfast, 795*
— — Mocassin Creek, Hetch Hetchy Water Supply, San Francisco, 125*
— — Steam, Castner-Kellner Alkali Co., Runcorn, 600-lb. Pressure Yarrow Boilers, 406*. See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
— — Steam and Electric, Super-Pressure, Billingham, 350
— — Steam, Modern Boiler Problems, 673
— — See also *Power Plants ; Substations*
— Statistics, Utilisation of, 834
— Steam, High Pressures and Temperatures, 299
— Supply, Electric, in Agriculture, 804
— — Electric, in Belgium, 92
— — Electric, in Berlin, 764
— — Electric, Central Scotland Electricity Scheme, 599*
— — Electric, Charges for, 835
— — Electric, in Crafts and Industry, 833
— — Electric, in Different Countries, 834, 835
— — Electric, for Domestic Purposes, 804
— — Electric, East England Electricity Scheme, 667*
— — Electric, Economics of, 122*
— — Electric, in Edinburgh, 715
Power Supply, Electric, in Ireland, 731*. See *Erratum*, 767
— — Electric, in Japan, 91, 92
— — Electric, and Low-Temperature Carbonisation, 50
— — Electric, Memoranda on Rural Electrification, 548
— — Electric, Municipal, 698
— — Electric, Municipal Undertakings and Electricity Committees, 698
— — Electric, Need for Voltage Standardisation, 511
— — Electric, North-East England Scheme, Government Assistance for Frequency Standardisation, 143
— — Electric, in Rural Areas, Bedford Scheme 355*
— — Electric, South West England and South Wales Electricity Scheme, 119*
— — Electric, in Spain, 318
— — Electric, in Sweden, 92
— — Electric, in United States, 92, 268
— — Electric, for Water Works Pumping Machinery, 809
— — of Russian Industries, 184
— — World Problems of, 834
— Transmission, Electric, Oil-Driven Rail-Car, Italian State Railways, 7*. See 186*, 624
— — Electric, Swedish State Railways, 117
— — Overhead Lines, Effect of Lightning, 93
— — Overhead Lines, Hetch Hetchy Water Supply, San Francisco, 127*
— — Overhead Lines, Inductive Interference by, 93, 251
— — Overhead Lines, Southern Ireland Electricity Scheme, 731*, 743, 771. See *Erratum*, 767
— — Overhead Lines, Testing Equipment for Towers, 88
— — on Vehicles and in Workshops, 835
— — See also *Gearing ; Marine Propulsion*
— Water, in Canada, 124, 536
— — *versus* Steam Power, Economics of, 122
— — Utilisation of Low Heads, 268
— — and Water Rights, 805
— — See also *Hydraulic ; Power Plants, Hydro Electric ; Turbines, Hydraulic*
— Wind, Utilisation of, 268
Preheaters, Air, Application of Regenerative Principle to, 155
— — Ljungström, Tests of, 155
Prentice, F., on a Waterless Gasholder, 742
"President," S.S., Atlantic Voyages of, 692
Presidential Address to Chamber of Shipping, by Sir A. M. Sutherland, on Position of Shipping Industry, 258
— — to Incorporated Municipal Electrical Association, by J. K. Brydges, on Electricity Supply, 698
— — to Institute of Metals, by Dr. R. Seligman, on the Work of the Institute, 352
— — to Institution of Gas Engineers, by C. S. Shapley, 742
— — to Institution of Naval Architects, by Lord Wemyss, 484
— — to Institute of Physics, by Dr. W. H. Eccles, on Physical Research in Wireless, 805
— — to Institution of Water Engineers, by H. E. Stilgoe, on Work of the Water Engineer, 710
— — to Junior Institution of Engineers, by Sir E. W. Moir, on Engineering Difficulties, 238
Press, Filter, for Porcelain Insulator Manufacture, 633*
— See *Machine Tools*
Pressure-Regulating Apparatus, Automatic, (Drayton Regulator and Instrument Co., Ltd.), 136*
— Vessels, Unfired, Fusion Welds for, 349, 353, 362*, 382, 386*, 394*, 427*
Preston, Dr. F. W., Strength of Thermally-Toughened Glass, 195
Prices of Metals. See *Metal-Price Diagrams*
Printing Machine, Box (Bohm und Kruse), 311*
Prop, Pit, Steel, Adjustable, Craggs-Plummer, 212*
Propane for Carburation of Water Gas, 148
Propellers, Aerial. See *Aeronautics*
— Efficiency, Italian Flotilla Leaders, 530, 568
— Shaft Failures, Airship "Graf Zeppelin," 43
Propulsion of Ships. See *Marine Propulsion ; Engines ; Turbines ; Propellers ; Ship Resistance*
Prytherch, W. E., on Gases in Copper, 384
Public Gas Lighting, A Pioneer of, 740
— Works and Building, International Congress, London. See *Building and Public Works*
— — Department, Nigeria, Report, 114
Pulverised Coal and Its Applications, 184
— — Barton Power Station Extension, Operating Results, 597, 684, 718, 739, 746
— — and Boiler-House Operation, 740
— — Installations, S.S. "Berwindglen" and "Berwindyale," 262
— — Fuel in Boilers and Metallurgical Furnaces, 185
— — Burner (Riley Stoker Corporation), 250*
— — Installation, S.S. "Hororata," 343*
— — and Mechanical Stoking, Relative Cost, 154
— — Plant, with Air Separation (British Rema Manufacturing Co., Ltd.), 826*
— — Plant, "Wood" Steam Generator, 144, 149,* 177
— — Plant, York Street Mills, Belfast, 797*
— — Progress in United States, 55
— — for Ship Propulsion, 287
Pump, Bore-hole, Steam Turbine-Driven, Roestock Pumping Station, 710, 713*, 751
— Casings, Concrete, Medemblik Pumping Station, 656*
— Centrifugal, Double Suction, Leemans Pumping Station, 761*
— — Medemblik Pumping Station, 655*. See LETTER, 743
— — 8,100-h.p. Rocky River Pumped-Storage Hydro-Electric Plant, 97*
— Feed, Rotary, Steam and Electrically-Driven. (G. & J. Weir, Ltd.), 683*
— Fuel, Junkers Heavy-Oil Aero Engine, 472*
— Gas-Displacement, for Drainage Work, 743
Pump, Gas-Displacement, Two-Stroke Cycle, Christie's, 404*
— Scavenging, Junkers Heavy-Oil Aero Engine, 472*
— Vacuum, Gaede (W. Edwards & Co.), 130
Pumping, Bore-Hole, Application of Steam Turbines to, 713*, 751*. See 710
— Machinery for Waterworks, Selection and Operation, 710, 809*, 839
— Plant, Paris Agricultural Machinery Exhibition, 432
— Set, Portable, Petrol-Driven (Heatly-Gresham Engineering Co., Ltd.), 208*
— Station, St. Joseph's Road, Guildford, Enlarging Borehole by Explosives, 298*
— — Zuyder Zee Reclamation Works, 665*, 759*. See LETTER, 743
Punjab Government, Mandi Hydro-Electric Scheme, 815*
Purification of Sewage. See *Sewage*
— of Water. See *Water*
Purves, Sir T. F., on Inductive Interference by Electric Power Lines, 351
Pyrene Company, Ltd., Opening of Brentford Works, 703
Pyrometer, Workshop, Pyroversum, 379
Pyromic Heat-Resisting Alloy (Gutta Percha Co., Ltd.), 219
Pyroversum Workshop Pyrometer, 379

Q.

QUANTUM Mechanics and Theory of Metals, 595
Quartzite Bricks, Composition and Properties, 391
Quay, Tyne Commission, North Shields, 332
— Barge-Unloading, Potash Storage and Shipment Plant, Antwerp, 305*
Quebec, Chute à Caron Hydro-Electric Power Plant, 323
— Hydro-Electric Power Developments, 62
— Saguenay and Chibougamau Railway, Progress of, 550
— St. Francis River, Proposed Hydro-Electric Plant, 147
Queensland Railways, Annual Report, 231
Quenching of Steel. See *Heat Treatment* under *Metallurgy*
Quicksilver. See *Mercury* and *Metal-Price Diagrams*

R.

"R 101," Airship, 187*, 271*. See 584
Radial Drill. See *Drill*, under *Machine Tools*
Radiant-Heat Boiler, "Wood," Experiences with, 143, 149*, 177. See LETTER, 263
Radiation in Boiler Furnaces, 673
— Pyrometers. See *Pyrometers*
Radio Communication, Elements of (Review), 191
— Research Board, Annual Report, 467
Radioactive Transmutation and Wave Mechanics, 549*
Radioactivity and Atomic Nuclei, 397*, 437*, 470*
Radiotelegraphy. See *Telegraphy, Wireless*
Radiotelephony. See *Telephony, Wireless*
Raies Ultimes Powders for Spectrographic Analysis, 52
Rail Brakes for Marshalling Yards, 724
— Breakage, Wear and Jointing, 707
— Car, Oil-Driven, with Electric Transmission, Italian State Railways (F.I.A.T. Co.), 7*. See 186*, 624
— Cutting Hack Saw, Hand-Operated, 588*
— Motor Vehicles, Use of, 757
— and Road Transport, Co-Ordination of, 81
— Steel, Prices. See *Metal-Price Diagrams*
Railless-Electric Vehicles and Motor Omnibuses, Relative Advantages, 228
Railroad, Pennsylvania, and Road Competition, 708
— See also *Railways*
Railway, Bombay, Baroda & Central India, Rebuilding of Bassein Bridges, 503
— Board, Indian, Report on Construction of Godavery Bridge, 160*
— Brake Testing Set, (Heatly-Gresham Engineering Co., Ltd.), 208*
— Bridge. See *Bridge*
— British and French, and Proposed Channel Tunnel, 381
— — and Road Competition, 709
— Canadian Pacific, Royal York Hotel, Toronto, Engineering Equipment of, 278 ; Branch-Line Construction Programme, 518
— Carriage. See *Carriage*
— Concrete Sleepers for, 659

Railway Congress, International, Madrid:
Inaugural Proceedings, 623
Plenary and Final Meetings, 820
Visits and Excursions, 820
Reports and Discussions :
Locomotives and Rolling Stock, 623
Improvements in Steam Locomotives, 626
Relations between Railways and Seaports, 658
Use of Concrete and Ferro-Concrete Sleepers on Railways, 659
Concrete and Reinforced Concrete Structures, 660
Machines for Simplifying Statistical Work, 661
Penetration Railways, 662
Electrification of Secondary Lines, 662
Resistance of Rails to Wear and Breakage, 707
Competition of Road Transport, 708
Electric Locomotives for Main-Line Traction, 722
Speed Control in Marshalling Yards, 724
Co-Operation of Staff, 725
Static and Dynamic Stresses on Railway Bridges, 754
Signalling, 756

Railway Congress, International, Madrid—*continued.*
Economic Traction Methods, 757
Rail Motor Vehicles, 758
Permanent-Way Equipment of Light Railways, 786
Permanent-Way Tools and Maintenance, 787
All-Steel Coaches, 789
Training of Staff, 819
Railway, East Indian State, Re-Girdering of Lower Sone Bridge, 562*. See *Erratum*, 697
— Economic Traction Methods on, 757
— Egyptian State, Articulated Steam Rail Coaches, 715*
— Electric Locomotives for Main-Line Traction, 722
— Electrification, Economic Results, 117
— — of Secondary Lines, 662
— Est, 4-8-2 Type Express Locomotive, 334*
— Ferro-Concrete Sleepers, for, 659
— Funicular, Japanese, 117
— German State, Operation of, 758
— — State, Turbine Locomotives on, 280*, 625
— Great Western, South Wales Docks Developments, 385 ; Reconstruction of Liskeard Viaduct and Approach Spans, Royal Albert Bridge, Saltash, 425 ; New Station at Temple Meads, Bristol, 605
— and Harbours, Kenya and Uganda, Report, 82
— Harbour Station Lay-Outs, 659
— Hudson Bay, Fort Churchill Harbour Works, 71 ; Proposed Connections with, 355
— Indian State, Loading Diagram, 566*
— Italian State, Oil-Driven Rail-Car with Electric Transmission, 7*. See 186 ; Oil-Driven Locomotive, 624
— Japanese Government, Train Ferries, 117 ; Analysis of Rail Failures, 708
— Kazipet-Belharshah, India, Construction of Godavery Bridge, 160*
— Light, Permanent-Way Equipment of, 786
— Liverpool and Manchester, Centenary (Review), 130
— Locomotive. See *Locomotive*
— London, Midland & Scottish, Furness Section, Reconstruction of Kent and Leven Viaducts, 426 ; 2-6-2 Type Tank Locomotive, 582* ; Turbine Locomotive, Operating Results, 624 ; Tilbury Station, 678*
— — and North Eastern, Three-Cylinder Passenger Locomotive with Rotary Cam Poppet Valve Gear, 39* ; 4-6-0 Type Locomotive, with Beardmore-Caprotti Valve Gear, 133* ; Locomotive-Coaling Plant at Kipps, 330* ; Tests of Locomotive, 626
— Maintenance Work on, 787
— Marshalling Yards, Speed Control in, 724
— Motor Carriage. See *Carriage*
— North-Western, India, Reconstruction of Attock Bridge, 503
— Paris, Lyons and Mediterranean, 5,400-h.p., Electric Locomotive, Tests, 793
— — Orleans, Concrete Sleepers on, 660
— Peace River and Vancouver, Proposed, 255
— Penetration and Feeder, Discussion on, 662
— Permanent-Way Tools, 787
— Quebec, Saguenay and Chibougamau, Canada, Progress of, 550
— Queensland, Annual Report, 231
— Rail-Motor Vehicles, Use of, 757
— and Road Competition, 708
Railway Rolling Stock Manufacturing Co., Ltd., Japan, 19
— — Stock. See also *Carriages ; Locomotives ; Wagons*
— and Seaports, Relations between, 658
— Signalling. See *Signalling*
— South Australian, Report, 290
— Southern, Waterloo Station, Facilities for Underground Passengers, 114 ; Proposed Channel Tunnel, 381 ; 4-4-0 Type "V" Class Passenger Locomotive, 408* ; Southampton Docks Extension, 573 ; Charing Cross Bridge Scheme, 640 ; Replacement of Folkestone Harbour Swing Bridge, 645*
— Staffs, Co-Operation of, 725
— — Training of, 819
— Station, Temple Meads, Bristol, 605
— Statistical Work, Machines for, 661
— Street, See *Tramways*
— Swedish State, Electrification, Transmission Plants, 117
— Swiss Federal, 7,200-h.p., Electric Locomotive, 509. See *Addendum*, 637 ; High-Pressure Passenger Locomotive, Operating Results, 625
— Traction by Oil Engines, 110
— Train Brake. See *Brake*
— Tube. See *Underground*
— Tunisian, Oil-Electric Locomotive, 624
— Underground. See *Underground*
— United States, Advances in, 626
— — States, Internal-Combustion Engine Locomotives on, 117
— Wagons. See *Wagons*
— Wheels, Flange Lubricator for (Hasler Telegraph Works), 538*
— See also *Railroads* and PARAGRAPH INDEX
Rainfall and Compensation Water Assessment, 832
— United States, and Hydro-Electric Power, 124
Ramzin, Prof. L. K., on Efficient Boiler-Plant Design, 154 ; on Consumption of Low-Grade Fuels in Russia, 184
Rand Water Board, Annual Report, 351
Rangoon, Port of, Annual Report, 231
Ransomes and Marles Bearing Co., Ltd., Roller-Bearing Plummer Blocks, 462*
Rapid Magnetting Machine Co., Ltd., Waterfall-Type Separator, 221*
Rateau, Prof. A., the Late, 86. See LETTER, 178
Rationalisation in Building Industry, 706
— New Forms of, 834
Raworth, J. E., the Late, 670
Read, A., on Electric Deck Auxiliaries, 483
Reclamation Works, Zuyder Zee, 655,* 759*, 770, 821*. See LETTER, 743

Recompression Chamber, Use in Hudson River Tunnel, 238
Record Electrical Co., Ltd., Exhibits at Physical and Optical Societies' Exhibition, 87; Triple-Pole Hand-Operated Circuit Breaker, 224*
Recorder, Idle-Time, for Machines (Gent & Co., Ltd.), 215*
Recording Dynamometer. See *Dynamometer*
— Microphotometer (Cambridge Instrument Co., Ltd.), 643
Reduction Gears. See *Gears; Marine Propulsion; Motor-Car Details*
Rees, D. P., on Oil-Well Deviation, 699
Rees, W. P., on Nickel-Chromium Alloys for High Temperature, 780*, 811*. See 641
Reeve, Dr. L., on Interaction of Gases and Ore in Blast Furnace, 647*. See 609
Refractometer, Photo-Electric (Bellingham & Stanley, Ltd.), 128
Refractories for Glass Manufacture, 525
— Sillimanite Glass-House, Results with, 525
Refractory Bricks, Composition, Structure and Properties of, 390
— Materials, Corrosion-Resisting Properties of, 525
— — Manufacture in America, 525
— — Properties of, 390
— — See also *Firebricks; Fireclays*
Refrigerant, Dichlorofluoromethane as, 776
Refrigerating Plant, Royal York Hotel, Toronto, (Linde Canadian Refrigeration Co.), 278*
— — for Turbo-Generators, 268
Regenerative Furnace. See *Furnace*
— Principle Applied to Air Preheaters, 155
"Regent," H.M. Submarine, Launch, 799
Registration of Engineers in Canada, 768
Regulating Weirs, Welland Canal Reconstruction, 157*, 725,* 790*
Regulations, Use of Trolley Wires in Mines, 380
Regulator, Speed, Scherbius, Medemblik Pumping Station, 656*
"Regulus," H.M. Submarine, Launch, 799
Reinforced Concrete. See *Ferro-Concrete*
Relays, Power Transmission Lines (A. Reyrolle & Co., Ltd.), 226
Remuneration of Labour. See *Labour*
Rendle, Palmer & Tritton, Re-Girdering River Sone Bridge, 562*. See *Erratum*, 697
Rensselaer Polytechnic Institute, Prospectus, 734
Repeated Stresses. See *Alternating Stress* under *Tests* (*Materials*)
Report, Accident Proneness and Proficiency, 24
— Annual, Association for Education in Industry and Commerce, 772
— — British Corporation Register of Shipping and Aircraft, 549
— — Chamber of Shipping, 258, 737
— — Electricity Commissioners, 18
— — National Institute of Industrial Psychology, 320
— — Northern Coke Research Committee, 590
— — Panama Canal, 230
— — Port of Rangoon, 231
— — Queensland Railways, 231
— — Radio Research Board, 467
— — Rand Water Board, 351
— — Scientific and Industrial Research Department, 174, 245
— — Skilled Employment and Apprenticeship Association, 329
— Assessment of Compensation Water, 832
— Atmospheric Pollution, 825
— Board of Trade, Boiler Explosion Inquiries, 453, 493, 577
— Building Research Board, 142; Protection of Mortar or Concrete against Frost, 237
— Central Electricity Board, 481
— Channel Tunnel Committee, 381
— Coal-Gas Poisoning, 261
— Construction of Godavery Bridge, Railway Board, India, 160*
— Corrosion of Lead in Buildings, 494
— Departmental Committee, Area Gas Supply, 705. See 699
— Deterioration of Structures in Sea Water, 544
— Economic Conditions in Argentine, 447
— — Conditions in Austria, 674
— — Conditions in China, 288
— — Conditions in East Africa, 512
— — Conditions in Poland, 770
— — and Trade Conditions in Australia, 228
— Effect of Asbestos Dust, and Dust Suppression, 577
— Engineering Training for Officers' Rank, 448
— — Wages and Hours in Germany, 146, 455
— Financial and Economic Conditions of Japan, 321
— Fires in Steamship Bunker and Cargo Coal, 463
— Home-Grown Timbers, Green and Seasoned, 667
— — Office, on Chains and other Lifting Appliances, 241
— Hydro-Electric Progress in Canada, 536
— Kenya and Uganda Railways and Harbours, 82
— London County Council, Thames Floods Prevention, 382
— Manchester Steam Users' Association, 673
— Mine and Works Ventilation, 536
— National Physical Laboratory, Executive Committee, 814
— Public Works Department, Nigeria, 114
— Re-Forming Natural Gas in Water-Gas Generators, 679
— Relative Inflammability of Coal Dusts, 536
— Road Traffic Census, 1928, 414
— Sewage Treatment by Stream-Flow Aeration, 504
— Sheffield Smoke Abatement Research Committee, 487
— South Australian Railways, 290
— Standardisation of Distribution Voltages, 511
— Steam Nozzles Research Committee, 291*, 296*, 361*. See 319, 329
— See also *Board of Trade*
Research Association, British Electrical and Allied Industries, Work of, 196
Research Association, British Non-Ferrous Metals, Investigation on Locomotive Firebox Stays and Plates, 30; Researches on Cast Copper and Bronze, 358*, 384, 457*, 522*
— — Industrial, and Application of Results of Research, 174
— — Industrial, Co-Operation with Department of Scientific and Industrial Research, 245
— Board, Building, Report, 142; Report on Protection of Mortar or Concrete against Frost, 237
— — Forest Products, Report on Home-Grown Timbers, 667; Drawing Machine, 644
— — Industrial Health, Report on Accident Proneness and Proficiency, 24
— — Radio, Annual Report, 467
— — Safety in Mines, Report on Relative Inflammability of Coal Dusts, 536
— Committee, Aeronautical, Work of, 612
— — Alloys of Iron, Researches on Alloys of Iron with Silicon, 642, 653*
— — Coke, Northern, Annual Report, 590
— — Illumination, Adoption of "Daylight Factor," 550
— — Midland Coke, Coke-Shatter Test Apparatus, 745*
— — Sheffield Smoke Abatement, Report, 487
— Department, Fuel, Report on Fires in Steamship Bunker and Cargo Coal, 463
— — Scientific and Industrial, Researches on Laminated Springs, 26*; Annual Report, 174, 245; Report of Radio Research Board, 467; Report on Corrosion of Lead in Buildings, 494; Report on Deterioration of Structures in Sea Water, 544; Appointment of Sir E. Rutherford as Chairman of Advisory Council, 644; Report on Atmospheric Pollution, 825
— — Woolwich, Investigations on Aluminium Brasses, 398, 554*; Exhibits at Royal Society Conversazione, 644
— Fund for William Froude Tank, 323
— Gas, and Leeds University, 742
— Influence of Technique on, 640
— Institutes, Tokyo Imperial University, 19
— — Tohoku Imperial University, Japan, 20
— Laboratory, High-Voltage (Metropolitan-Vickers Electrical Co., Ltd.), 312*
— — Steatite and Porcelain Products, Ltd., 634*
— — Tokyo Electric Co., 19
— Physical, in Wireless, 805
— Psychological, in Engineering Trades, 320
— Scientific, in Buildings and Public Works, 707
— Set, Fuel, Variable-Compression (Sir W. G. Armstrong, Whitworth & Co. (Engineers), Ltd.), 44*
— Station, Building, Report on Corrosion of Lead in Buildings, 494; Microvolt-Hour Meter, 675
— Steam Nozzles, Report of Committee, 291*, 296*, 361*. See 319, 329
— Work, Increasing Importance of, 834
— Workers, Need for, 174
— See also *National Physical Laboratory*
Reservoirs and Compensation Water, 832
— for Japanese Hydro-Electric Plants, 267
— Regulating, Mocassin Creek, Hetch Hetchy Water Supply, San Francisco, 125*
— Rocky River Hydro-Electric Development, 35*
— Water, Elevated, Ferro-Concrete, Sydney, 137
Resistance, Air. See *Air* and *Aeronautics*
— Electrical. See *Electric*
— and Form of Towed Barges, 531
— of Ships. See *Ship Resistance*
— Welding. See *Welding*
"Resource," H.M. Fleet-Repair Ship, 12*
Retort for Australian Shale, 109
Reviews. See LITERATURE INDEX
Reynolds, R. W., on Design of Ferro-Concrete Tee Beams, 591*
Reyrolle, A., & Co., Ltd., Electric Heating Elements, Thermal-Storage Plant, 94*; Arc Welder, 225*; Power Transmission Line Relays, 226
"Rhadamanthus," H.M.S., Atlantic Voyage of, 691
Rhineland-Westphalia District, Engineering Wages in, 146
Rhodes, J., & Sons, Ltd., Exhibits at British Industries Fair, 207
Ricardo, H. R., on High-Speed Diesel Engines, 607; on Progress of Aircraft Engines, 738. See LETTERS, 776, 838
Rice, E. W., on Recent Economic Developments of Electric Power, 92
Rice & Co. (Leeds), Ltd., Hydraulic Boiler-Plate Flanging Press, 14*
Richmond Power Station, United States, Operating Results, 746*
Rickard, Dr. T. A., on Early Use of Metals, 352
Rickli, H., on Heat Treatment of Alloy Steels, 141; on Safety in Large Turbo-Generators, 421*
Ridge Formation in Sounding Tubes, 676
Rigid Airships. See *Airships* under *Aeronautics*
Riley Stoker Corporation, Water Wall for Boiler Furnaces, 74*; Pulverised-Fuel Burner, 250*
"Rimutaka," S.S., Failure of Copper Steam Pipe, 493
Ring-Oiled Bearings, Researches on, 146*
Ritchie, Dr. E. G., on the Storage of Steam, 155
River Arakawa, Japan, Improvement Works, 18
— Ashop, Diversion of, 301
— Churchill, Canada, Hydro-Electric Power Plant, 442
— Clyde and Forth, Overhead Power Transmission Line, 603*
— Dordogne Arch Dam, Marège, France, 578
— Flow of, and Assessment of Compensation Water, 832
— Ganges, Floating Dock for, 13
— Gila, Arizona, Coolidge Multiple-Dome Dam, 193*, 276*, 368*
— Godavery Bridge, India, Handling and Erecting Gear, 160*
— Hooghly, Calcutta, Cable Tunnel under, 124
River Hudson Bridge, Cost of, 114
— — Tunnel, Difficulties in Construction, 238
— Indus, Reconstruction of Attock Bridge, 503
— Kiso, Japan, Hydro-Electric Power Plant, 19
— Nile, Assouan Dam, Sluice Discharge, 23; Heightening of, 101*
— — Nag Hamadi Barrage, Construction Cableways, 252
— Rocky, Hydro-Electric Development, 35*,97*
— San Joaquin, Crossing, Overhead Power Transmission Towers, Hetch Hetchy Water Supply, San Francisco, 127*
— Sone, India, Re-Girdering of Railway Bridge, 562*. See *Erratum*, 697
— St. Francis, Quebec, Proposed Hydro-Electric Plant, 147
— St. Lawrence, Hydro-Electric Scheme, 62
— Thames, Blackwall Tunnel, Difficulties in Construction, 238
— — Floods Prevention, London County Council Report, 382
— — Passenger Landing Stage at Tilbury, 678*
— Uhl, North India, Hydro-Electric Scheme, 815*
— Velocity, Depth and Silt Transport Formulæ, 179
Road, Experimental, Hounslow and Slough, 321
— Impact Reaction of Motor-Lorry Wheels on, 69, 95
— Locomotives. See *Motor; Tractor*
— and Rail Transport, Co-Ordination of, 81
— and Railway Competition, 708
— Tar, Standard Specification, 71; Preparation of, 742
— Traction, Railless Electric. See *Railless*
— Traffic Census, 1928, Report, 414
— — Heavy, and Manchester Ship Canal Bridges, Lawsuit, 411
— Transport, Methods of, 228
— Works, Expenditure on, 414
Robertson, Dr. J. M., on Metallography of Ancient Egyptian Implements, 641
Robins Conveying Belt Co., Conveyor-Belt Cleaner, 248*
Robinson, E. L., on Steam Turbine Development, 156
Rock, Rear Admiral G. H., on Safety of Life at Sea, 263
Rocket Flight, Theory of (Review), 275
Rocky River Hydro-Electric Development, 35*, 97*
Roe, A. V., & Co., Ltd., Fokker Monoplanes for Australian Air Service, 412
Roestock Pumping Station, Turbine-Driven Pumping Plant, 710, 713*, 751*
Rolls, Chilled-Iron, Manufacture (Review), 274
— Tin and Sheet-Mill, Treatment, Performances and Failures, 611, 615*
Roller Bearings. See *Bearings*
— Motor, Manumit, Power Unit for (Marshall, Sons & Co., Ltd.), 216*
Rolling Mills, Lubrication of, 377*, 749
— — Plant, 35-in. Reversing Roughing (Brightside Foundry and Engineering Co., Ltd.), 103*
— Stock. See also *Carriages; Locomotives; Wagons*
Röntgen Ray Analysis, Moseley's Work, 372*
— — Examination of Materials, 475, 486, 525*
— — Photographs of Crystal Structures, 676
— — Studies of Cupped Copper, 61
Rope Drive, York Street Mills, Belfast, 795*
— Wire. See *Wire Ropes*
Ropeway, Aerial. See *Wire Ropeway*
Rosencrants, F. H., on High-Pressure Steam, 154
Rosenhain, Dr. W., Award of Bessemer Medal, 582, 609; on Nickel-Chromium Alloys for High Temperatures, 780*, 811*. See 641
Ross and MacDonald, Inc., Royal York Hotel, Toronto, 279*
Ross Patents, Ltd., Chain Feeder for Materials, 211
Rotary Cement Kilns, Pulverised-Fuel Firing, 185
— Engine. See *Engine; Aeronautics*
— Pump. See *Pump*
Rotors, Large, Stresses in, 421*
— Turbo-Generator, Steels for, 141
— Windings, Aluminium for, 423
Roubals, Babcock & Wilcox Boilers with Gilled Water Tubes at, 421*
"Rover," H. M. Submarine, Launch, 799
Rowell, Dr. H. S., on Influence of British Motor Taxation on Petrol-Engine Design, 303*, 366. See LETTERS, 776, 808; on Thread Rolling, 721*. See *Errata*, 766
Royal Aeronautical Society. See *Aeronautical*
— Agricultural Hall. See *Exhibition*
— — Society. See *Agricultural*
— Albert Bridge, Saltash, Reconstruction of Approach Spans, 425
— Automobile Club, Taxation Formula, 303*, 366
— Charter for Institution of Mechanical Engineers, 769
— Corps of Naval Constructors, Annual Dinner, 199
— Indian Marine Sloop "Hindustan," Launch, 702
— Institute of British Architects. See *British Architects*

Royal Institution:

Diving, by L. Hill, 259
Atomic Nuclei and their Structure, by Sir E. Rutherford, 371*, 397*, 437*, 470*
Isotopes, by Dr. F. W. Aston, 461*
Structure of Cellulose, by Sir W. Bragg, 525*
Transmutation of Matter, by Sir E. Rutherford, 549*
Phenomena of Spin in Aeroplanes, by H. E. Wimperis, 674
English Instrument Makers of the Eighteenth Century, by R. S. Whipple, 772
Faraday Centenary Celebrations, 1931, Programme, 832

Royal Meteorological Society. See *Meteorological*
— Ordnance Factories, Woolwich, Production and Distribution of Steam in, 585*, 579, 618*, 650*
Royal Sanitary Institute. See *Sanitary Institute, Royal*
— Society, Conversazione and Exhibition, 643, 675, 823
— — of Arts. See *Arts*
"Royal William," S.S., Atlantic Voyage, 691
— York Hotel, Toronto, Engineering Equipment of, 278*
Royles, Ltd., Water Chlorinators, 216*; Distilling Apparatus, 216*
Rumsey, J., Work of, 333
Runcorn Power Station, Castner-Kellner Alkali Co., 600-lb. Pressure Yarrow Boilers, 406*. See 416. See LETTERS, 487, 517, 571. See *Erratum*, 509
Rural Electricity Scheme, Bedford, 355*
— Electrification, Memoranda on, 548
— — in Sweden, 92
Russia, Combustion of Low-Grade Fuels in, 184
— Thermo-Technical Institute, Boiler Experiments, 155
Russian Industries, Power Supply of, 184
Rusting. See *Corrosion*
Ruston & Hornsby, Ltd. Exhibits at British Industries Fair, 206
Rutherford, Sir E., Award of Faraday Medal to, 139, 595; on Atomic Nuclei, 371*, 397*, 437*, 470*; on the Transmutation of Matter, 549*; Appointment as Chairman of Research Advisory Council, 644
Ruths Accumulators, Charlottenburg Power Station, 764*
Ruths, Dr. J. C., on the Ruths Accumulator in the Power Industry, 155
Ryburg-Schwörstadt Power Supply Co., 32,500 kv.-a. Slow-Speed Alternator, 743*
Ryder, J., on Training of Welders, 349. See 387

S.

SACK-FILLING, Weighing, Sewing and Discharging Machines, Potash Shipment Plant, Antwerp, 365*
Säckingen, Germany, 32,500 kv.-a. Alternator for Hydro-Electric Power Plant, 743*
Safe-Load Indicator for Cranes (Nash Safe-Load Indicators, Ltd.), 807*
Safety in Large Turbo-Generators, 421*. See 141
— of Life at Sea, 263
— — at Sea (1929 Conference), 485, 489*
— First Association, National, 513
— Glass Manufacture, 630*. See LETTER, 679. See *Addendum*, 703
— Horns, Welland Ship Canal Reconstruction, 336*, 401*
— in Mines Research Board, Report on Inflammability of Coal Dusts, 536
— Week, National, 513
— Weirs, Welland Ship Canal Reconstruction, 157*, 725*, 790*
Saint John Harbour, Canada, Extension, 720
— See also *St.*
Salford Royal Technical College, John Morris Memorial Prize, 170
"Salt Lake City," United States Cruiser, Babcock & Wilcox Boilers, 262
Saltash, Royal Albert Bridge, Reconstruction of Approach Spans, 425
Sampling and Analysis, Coal, Royal Ordnance Factories, Woolwich, 587
San Francisco, Hetch Hetchy Water Supply, 125*. See 252
— Joaquin River Crossing, Overhead Power Transmission Towers, Hetch Hetchy Water Supply, San Francisco, 127*
Sand, Internal Friction of, Experiments on, 689*, 753*
Sanitary Institute, Royal, Henry Saxon Snell Prize, 88
Sankey Diagram for Super-Pressure Steam Power Station, 58*
"Saratoga," United States Aeroplane Carrier, Trial Trip Data, 263
Saturator and Acid Separator, Becker Coke-Oven Plant, Sheffield, 699*
Sault Ste. Marie, Electro-Metallurgical Plant at, 256
Saunders, Comdr. H. E., on Corrosion-Resisting Steel and its Application to Ships, 263
Saunders, Dr. H. L., on Interaction of Gases and Ore in Blast Furnace, 647*. See 609
"Savannah," S.S., Atlantic Voyage of, 690
Saws. See *Machine Tools*
Scaling, Resistance of Alloy Steels to, 682*
— Tools, Rotary, Electrically-Operated (Consolidated Pneumatic Tool Co., Ltd.), 63*. See *Erratum*, 79
"Scarborough," H.M. Sloop, Launch of, 379
Scherbius Speed Regulator, Medemblik Pumping Station, 656*
Schmidt-Henschel High-Pressure Locomotive, Operating Results, 625
Schneider, E., Award of Bessemer Medal to, 582, 609
Scholarships. See *Education*
Schuler, L., A.-G., Bottoming Machine for Tins, 373*
Schuster, L. W., on Fusion Welds for Unfired Pressure Vessels, 362*, 394*, 427*. See 349, 353, 382, 386*
Schutte & Koerting Co., High-Pressure Toggle-Operated Stop Valves, 652*
Science and the Iron and Steel Industry, 751
— and Technology, History of, International Congress, 568
— in Works Management, 383
Scientific Apparatus, Physical and Optical Societies' Exhibition, 52*, 86*, 128*, 323, 343
— — Exhibition, Royal Society Conversazione, 643, 675, 823
— Research. See *Research*
— Societies. See *Institutions*
Scleroscope Tests. See *Hardness* under *Tests* (*Materials*)
Scotland, Central, Electricity Scheme, 590*
— Institution of Engineers and Shipbuilders in. See *Engineers*
— Southey's Journal of Tour in, 1819 (Review), 501

Scott's Shipbuilding and Engineering Co., Ltd., Trials of H.M. Destroyer "Anthony," 196
Scraper, Power-Operated (Alig & Baumgärtel), 519*
— Travelling, Potash Storage and Shipment Plant, Antwerp, 306*
Screen Shafts, Circulating-Water, Portishead Power Station 433*
Screw-Cutting Lathe. See *Lathe* under *Machine Tools*
— Propellers. See *Propellers; Aeronautics*
— Thread Milling and Grinding Machines, D. Brown & Sons (Huddersfield), Ltd., 693*
— — Rolling, 721*. See *Errata*, 766
— — Tolerances, German (Review), 562
Scrubbers, Carbon-Dioxide, Ammonia Production Plant, Mont Cenis Colliery, 163*
Sea Water, Concrete Hardening in, 67*
— — Corrosion of Iron and Steel, 544
Seaports and Railways, Relationship, 658
Season-Cracking of Aluminium Brasses, 555
— — and Initial Stresses in Hard-Drawn Tubes, 65*
Seco Substation, Hetch Hetchy Water Supply, San Francisco, 127*
Secondary Schools and Education. See *Education*
Seddon, E., Portobello Power Station Extension, 715
Seely, Prof. F. B., on Plaster Models for Stress Determination, 231
Seismic Waves Produced by Meteor, 669
Seismograph for Geophysical Surveying (Cambridge Instrument Co., Ltd.), 52*
Seitz, E., on Development of the Francis Turbine, 267
Selfridge & Co., Ltd., Explosion of Steam-Heated Oven, 453
Seligman, Dr. R., on the Work of the Institute of Metals, 352
Sensitive Drill. See *Drill* under *Machine Tools*
Sentinel Motor Wagon, with Paris Concrete Mixer, 631*
Separator, Acid, Becker Coke-Oven Plant, Sheffield, 699*
— Magnetic, Waterfall-Type (Rapid Magnetting Machine Co., Ltd.), 221*
— Oil, Marine Type, De Laval, 199*
Serruys, Prof. D., on Rationalisation, 834
Sewage Treatment by Stream-Flow Aeration, Report, 504
— See also PARAGRAPH INDEX
Sewers, Gas Exhauster for (Siemens-Schuckertwerke A.-G.), 376*
Shaft, Crank. See *Crankshaft*
— Dynamometer. See *Dynamometer*
— Screen, Circulating-Water, Portishead Power Station, 433*
— Tunnel, Hetch Hetchy Water Supply, San Francisco, 125*
Shafting, Critical Speed of, and Vibration in Ships, 529, 551*
— and Gearing, York Street Mills, Belfast, 795*
Shale, Australian, Retort for, 109
Shannon Hydro-Electric Power Plant, 731*, 743, 771. See *Erratum*, 767
Shaping Machine. See *Machine Tools*
Shapley, C. S., Presidential Address to Institution of Gas Engineers, 742
Shatter-Test Apparatus for Coke, 745*
Shearing Machine. See *Machine Tools*
Sheet Piling, Steel, Zuyder Zee Reclamation Works, 762*, 821*
— Steel, Normalising and Box-Annealing of, 583*, 610
Sheffield Smoke Abatement Research Committee, Report, 487
Shepard Niles Crane and Hoist Corporation, Electric Trolley Hoist, 122*
Sherman Island Dam, Hudson River, Uplift Diagram, 235*
Shibaura Engineering Works, Ltd., Tsurumi Factory, 18
Shield, Blackwall Tunnel, 239
Shinano-Gawa Hydro-Electric Plant, 154
Ships, Boat Equipment of, 491
— British Corporation Register of Shipping and Aircraft, 323
— Canal. See *Canal*
— Construction, Isherwood System, Annual Return, 202
— under Construction, Lloyd's Statistics, 88, 513
— Corrosion-Resisting Steels for, 263
— Diesel-Engined. See *Motor Ships; Marine Propulsion*
— Electric Propulsion. See *Marine Propulsion*
— Electrical Deck Machinery for, 483
— Launched, Annual Statistics, 166, 260
— Motor. See *Motor Ships; Marine Propulsion*
— Passenger, Causes of Creaking in, 515. See LETTER, 572
— Pioneer, of the Atlantic Ferry, 298
— Power Supply on, 835
— Propellers. See *Propellers*
— Propulsion. See *Marine Propulsion; Engines; Turbines; Propellers*
— Resistance, Experiments on Towed Barges, 531
— — Model Tests of Single-Screw Merchant Vessel, 263
— — Wave Making. Model Experiments, 532
— Safety of Life at Sea, 263, 485, 489*
— Sailing and Steam, Early Statistics, 498
— Single-Screw, Model and Full-Size Tests, 263
— Stability of Listed, 515
— Subdivision of, 485, 489*
— Twin-Hulled, "Cast Ilia" and "Calais-Douvres," 96
— Vibration in, Causes and Prevention, 529, 551*
— Wave Resistance, Mathematical Theory and Experimental Results, 532
— See also *Marine; Motor Ships; Shipping; Steamers; Warships*; and PARAGRAPH INDEX
Shipbuilders and Engineers, North East Coast Institution of. See *North-East Coast*
— — in Scotland, Institution of. See *Engineers*
Shipbuilding, British Corporation Register, 323, 549
— Bulk-Freight of Great Lakes, 262
— Co-Operation between Naval Architects and Marine Engineers, 482
Shipbuilding, Corrosion-Resisting Steels for, 263
— Creaking in Passenger Ships, 515. See LETTER, 572
— on Great Lakes during War, 262
— Industry, Position and Prospects, 260
— Isherwood System, Annual Return, 202
— Naval. See *Warships*
— Safety of Life at Sea, 263, 485, 489*
— in 1929, Statistics, 46, 138
— Subdivision of Ships, 485, 489*
— Vessels under Construction, Lloyd's Statistics, 88, 513
— Vessels Launched, Statistics, 166, 260
— Vibration in Ships, Causes and Prevention, 529, 551*
— See also *Steamers; Naval; Warships*; and PARAGRAPH INDEX
Shipment and Storage Plant, Potash, Antwerp, 305*, 365*
Shipping and Aircraft, British Corporation Register of, Annual Report, 549
— Boat Equipment of Ships, 491
— Chamber of, Annual Meeting and Report, 258, 737
— Industry, Position of, 258
— and Naval Annual, Brassey's (Review), 500
— Safety of Life at Sea, 263, 485, 489*
— Vessels under Construction, Lloyd's Statistics, 88, 513
— — Launched, Statistics, 166, 260
Shipyard, Swan, Hunter, & Wigham Richardson, Ltd., 5-ton Cantilever Crane, 253*
Shock Absorber, Oleo-Pneumatic, for Aeroplanes (Blackburn Aeroplane and Motor Co., Ltd.), 647*
— Tests. See *Impact Tests* under *Tests (Materials)*
Shop Management. See *Works Management*
Shore Instrument and Manufacturing Co., Monotron Hardness Indicator, 252*
— Scleroscope Tests. See *Hardness* under *Tests (Materials)*
Show. See *Exhibition*
Shuttering, Timber, for Wall Monoliths, Entrance Lock, Ymuiden, North Sea Canal, 68*
Siberian Meteor, Seismic and Aerial Waves Produced by, 669
Siemens-Martin Furnaces. See *Furnaces*
Siemens-Schuckertwerke A.-G., Gas Exhauster for Sewers, 376*; Three-Phase Switchgear with Air Blowout, 376*; Southern Ireland Electricity Scheme, 731*, 743, 771. See *Erratum*, 767; 20,000-kw. Accumulator Turbines, 764*
Signalling from Cages in Mines, 54
— Railway, Standard Symbols, 734
— — Systems in Use, 756
— System for Power Stations (Hopkinsons, Ltd.), 392*
Silentbloc Flexible Bearing, 522*
Silesia, Beuthen, Hohenzollern Colliery, Aerial Coal Transporter with Travelling Tower, 629*
Silica Bricks. See *Firebricks*
— Softening and Melting Points of, 390
Silicol Hydrogen Plant, Airport of St. Hubert, Montreal, 844
Silicon-Chromium Steels, Properties of, 643, 680*
— Iron Alloys, Constitution, 642, 653*
Sillimanite Bricks, Composition and Properties of, 392
— Glass-House Refractories, Results with, 525
Silos, Use in France, 432
Silt Transport in Canals and Rivers, 179
Simpson, Dr. C. G., Award of Symons Medal, 148
Sinclair, D., the Late, 636
Sinnatt, Dr. F. S., on Coal Cleaning, 449
"Sirius," S.S., Atlantic Voyages of, 692
Sisson, W., & Co., Ltd., High-Speed Steam Engine with Expansion and Compression Governor, 570*, 813*
Skelton, Engr. Vice-Admiral R. W., on Progress in Marine Engineering, 49
Skin Friction. See *Air Resistance; Aeronautics; Hydrodynamics; Ship Resistance*
Skinningrove, Fuel Economy at, 588*, 610, 617*
Skyscrapers in United States and Canada, 581
Slab and Block Machine, Concrete (Lee & Fouracre), 211
— Protection, Welland Ship Canal Reconstruction, 726*
Sleepers, Railway, Concrete and Ferro-Concrete, Use of, 659
Slough and Hounslow, Experimental Road, 321
Sluices, Discharge, Den Oever, Zuyder Zee Reclamation Works, 821*
— Discharge Measurements, Assouan Dam, 23
— Gates, Medemblik Pumping Station, 656*
— — Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— Stoney, Welland Ship Canal Reconstruction, 728*, 792*
Smelting Furnaces. See *Furnaces*
Smith, Dr. E. W., on Gas Dehydration, 742
Smith, Engr.-Capt. E. C., on Pioneer Ships of the Atlantic Ferry, 298; on Naval and Marine Engineering History, 333, 498, 690
Smith, H. D., on Reconstruction of Liskeard Viaduct and Approach Spans, Royal Albert Bridge, Saltash, 425
Smith, J., Pioneer of Transatlantic Steam Navigation, 691
Smoke Abatement Research Committee, Sheffield, Report, 487
Smokeless Fuel. See *Coal, Low-Temperature Carbonisation*
Smyth, E. W., on Experiences with the First "Wood" Steam Generator, 149*. See 143, 177. See LETTER, 263
Smythe, E. H., on Low-Temperature Distillation in Relation to Power Production, 184
Société Commerciale des Potasses d'Alsace, Potash-Storage Depot, Antwerp, 305*, 365*
Societies, Technical and Scientific. See *Institutions*
— Trade. See *Labour; Labour Notes*
Society of Motor Manufacturers and Traders. See *Motor*
Sockets, Cable, Sydney Harbour Bridge, 496*
— and Plugs, Standard Specification, 752
Sodingen, Dortmund, Mont Cenis Colliery, Linde Plant for Coke-Oven Gas Decomposition, 163*
Sodium Chloride, Protection of Mortar or Concrete against Frost, 237
Softener, Water. See *Water Softener*
Soil Mechanics, Researches on, 639
Sone River, Re-Girdering of Railway Bridge, 562*. See *Erratum*, 697
Soot Blowers, "Wood" Steam Generator, 152*
Sounding, Echo-, Marine Equipment, 129
— Tubes, Ridge Formation in, 676
Sousedik Automatic Starter for Three-Phase Motors, 106*
South Africa, Rand Water Board, Annual Report, 351
— Australian Harbours Board, Pile-Driving Plant, Adelaide Harbour, 57*
— — Railways, Report, 290
— Wales Docks Developments, Great Western Railway, 385
— West England and South Wales Electricity Scheme, 119*
— — Notes from, 14, 47, 79, 109, 138, 171, 201, 254, 285, 316, 347, 379, 411, 444, 479, 509, 541, 573, 605, 637, 671, 703, 735, 767, 799, 829. See PARAGRAPH INDEX
— Yorkshire, Notes from, 15, 46, 79, 109, 139, 170, 200, 255, 284, 317, 347, 379, 411, 444, 479, 509, 541, 572, 604, 637, 671, 703, 735, 767, 799, 829. See PARAGRAPH INDEX
— — Use of Coke-Oven Gas in, 705
Southampton Docks Extension, 573
Southern Ireland Electricity Scheme, 731*, 743, 771. See *Erratum*, 767
— Railway, Waterloo Station, Facilities for Underground Passengers, 114; Proposed Channel Tunnel, 381; 4-4-0 Type "V" Class Passenger Locomotive, 408; Southampton Docks Extension, 573; Charing Cross Bridge Scheme, 640; Replacement of Folkestone Harbour Swing Bridge, 645*
Southey's Journal of Tour in Scotland, 1819 (Review), 501
Southwell, Prof. R. V., on Aeronautical Progress, 611
Space, Physical, and Ether Problems, 805
Spain, Electric Power Supply in, 318
Specific Gravity of Liquids, Instrument for Rapid Determination (W. & T. Avery, Ltd.), 215*
Specifications, Standard. See *Standard; Standardisation*
— Steel, and Physical Properties, 749
Spectra, Mass, Aston's Work, 397*, 437*, 470*
Spectrographic Analysis, Rates Ultimes Powders for, 52
Spectroscopy, Fabry-Pérot Étalon (A. Hilger, Ltd.), 675
Speed-Reduction Gears. See *Gears; Gearing; Marine Propulsion; Motor-Car Details*
— Regulation. See also *Governing*
— Regulator, Scherbius, Medemblik Pumping Station, 656*
— Trials. See *Trials*
Spelter Prices. See *Metal-Price Diagrams*
Sperry, E. A., the Late, 803*
Spheroidisation of Cementite in Superheater Tube, 265
Spillways, Coolidge Multiple-Dome Dam, Arizona, 193*, 369*
Spin in Aeroplanes, 674
Spinell Bricks, Composition and Properties, 392
Spinning Mills, Flax, York Street, Belfast, Electrification of, 795*
Spontaneous Combustion, Bunker and Cargo Coal, Report, 463
Spray Apparatus for Corrosion Tests, 389*. See LETTER, 454
Springs, Laminated, Researches on, 26*
Sprinkling Stoker. See *Stoker*
Spur Gearing. See *Gears; Gearing; Marine Propulsion*
Spyer, A., on High-Pressure Steam for Marine Propulsion, 156
St. Francis River, Quebec, Proposed Hydro-Electric Plant, 147
St. Hubert Airport, Montreal, 842*
St. Joseph's Road Pumping Station, Guildford, Enlarging Borehole by Explosives, 298*
St. Lawrence River, Hydro-Electric Scheme, 62
St. Paul's Cathedral Re-Opening, 831. See 823
Stability of Listed Vessels, 515
— of Submarines, 484. See LETTERS, 776, 484
Stamer, F., on Progress of Gliding, 259
Standards Association. See *Engineering Standards*
— Railway Signalling Symbols, 734
— Specifications, British, Tests for Timbers, 63; Road Tar, 71; Alternating Current Switchgear, 321; Switches and Circuit Breakers, 54; Copper Wire for Electrical Machinery, 57; Aluminium Conductors, 445; Vandyke Brown; 509; Copper Conductors, 671; Plugs and Sockets, 752; Flame-Proof Switches and Circuit Breakers, 799; Electricity Meters, 812
— — Canadian, Steel Bars and Billets, 252; Steel Structures for Buildings, 811
— United States Bureau of. See *United States*
Standardisation of Distribution Voltages, Report, 511
— and Rationalisation of Statistics. 834
Starters, Motors. See *Motors, Electric*
State Railways. See *Railways*
"Statendam," S.S., Machinery and Performances, 491*, 513
Statically-Indeterminate Structures, Stress Calculations (Review), 131
Stations, Harbour, Layout of, 659
— Power. See *Power Stations*
— Railway, Temple Meads, Bristol, 605
Statistical Work, Railway, Machines for, 661
Statistics, Power, Utilisation of, 834
— Trade. See *Trade*
Stays, Firebox, Locomotive Boiler, Investigations, 30
Steam Accumulators, Ruths, Charlottenburg Power Station, 764*
— — Ruths, in the Power Industry, 155
— Boats. See *Steamers*
— Boilers. See *Boilers*
— Distributing System, S.S. "Statendam," 491*, 513
Steam Engines. See *Engines*
— Flow through Nozzles. See *Nozzles*
— Heated Ovens, Bakers', Explosions of, 455, 493
— High-Pressure, Economical Advantages, 154
— — Pressure, Generation of, 58*
— — Pressure, in German Power Stations, 267
— — Pressure, for Marine Propulsion, 156
— — Pressure, Operating Results, Barton Power Station Extension, 597*, 684*, 718*, 739, 745*
— — Pressure, Use on Locomotives, 625
— — Pressure, Use in United States, 55
— Lorries. See *Motor Wagons; Tractors*
— Losses in Distribution Mains, 579, 587, 650
— Navigation, Early History, 333, 498, 690
— Pipe, Copper, Failure in S.S. "Rimutaka," 493
— — Expansion of, 579, 587
— — Magnesia Lagging for, 579, 587, 650
— — Thermal Efficiency of Distribution in, 579, 587*, 650
— Power *versus* Water Power, Economics of, 122
— Production and Distribution in Large Factories, 585*, 579, 618*, 650*
— Properties of, American Researches, 257
— — at High Pressures and Temperatures, 89*
— — of, Work of Callendar, 115
— Reaction on Molten Copper, 460*
— Superheater. See *Superheater*
— Traps, Curtis (J. d'Este Co.), 250
— Trials. See *Trials*
— Turbines. See *Turbines*
— Users' Association. See *Manchester*
— Wagons. See *Motor Wagons; Tractors*
Steamer "Akibasan Maru," Performance, 186
— Atlantic, Early, 690
— "Berenice," Voyage to India, 500
— "Berwindglen" and "Berwindyale," 262
— British Corporation Register of Shipping and Aircraft, 323
— Bulk-Freighters of Great Lakes, 262
— Cargo, British, Position of, 737
— "Carnarvonshire," Explosion of Stop Valve, 493
— "City of Cambridge" Bauer-Wach Exhaust-Steam Turbine Installation, 139
— Constructed on Great Lakes during War, 262
— under Construction, Lloyd's Statistics, 88, 513
— Cross-Channel, "Bessemer," "Castalia," and "Calais-Douvres," 96*
— Early History of, 333, 498, 690
— Electric Propulsion. See *Marine Propulsion*
— "Empress of Britain," Launch, 773
— "Enterprise," History of, 498
— Fires in Bunker and Cargo Coal, Report, 463
— Geared Turbines for. See *Marine Propulsion*
— "Hobson's Bay," Reconditioning of, 541
— "Hororata," Pulverised-Fuel Installation, 343*
— "King George V," Boiler Explosion, 453
— Launched, Annual Statistics, 166
— and Motorships, Operating Costs of Engine Departments, 263. See 186
— Oil-Burning, and Motorships, Comparisons, 186. See 263
— Passenger, Causes of Creaking, 515. See LETTER, 572
— "Pensilva," Explosion of Stop Valve, 493
— Pioneer, of the Atlantic Ferry, 298
— Propulsion of. See *Marine Propulsion; Engines; Turbines; Propellers*
— Power Supply on, 835
— Resistance of. See *Ship Resistance*
— "Rimutaka," Failure of Copper Steam Pipe, 493
— and Sailing Ships, Early Statistics, 498
— Stability with List, 515
— "Statendam," Machinery and Performances, 491*, 513
— Turbo-Electric, for Peninsular and Oriental Steam Navigation Co., 139. See 513, 519*
— "Viceroy of India," Turbo-Electric Drive, Performances, 513, 519*. See 139
— See also *Engines; Marine Propulsion; Shipbuilding; Shipping; Ships; Turbines; Warships*; and PARAGRAPH INDEX
Steamships. See *Steamers; Ships; Warships*
Steatite and Porcelain Products, Ltd., Stourport Factory, 632*
Steels, Alloy, Heat Treatment of, 141. See 422
— Bars and Billets, Canadian Standard Specifications, 252
— Bessemer, the Case for, 413. See LETTER, 517
— for Boiler Tubes, 473, 486
— Chromium-Copper, Structural, Properties of, 642, 687*
— — Manganese, Properties of, 749
— — Properties of, 643, 680*
— Coaches, Railway, 789
— Corrosion-Resisting, for Ships, 263
— — See *Corrosion*
— Fatigue of. See *Alternating Stress* under *Tests (Materials)*
— Foundry. See *Foundry*
— Furnaces. See *Furnaces*
— Heat Treatment of. See *Heat Treatment* under *Metallurgy*
— High-Tensile, Fatigue Limit and Yield Point in, 231*. See 543. See LETTERS, 632*, 710*
— — Tensile, for St. Paul's Cathedral Restoration, 823
— House Construction, 749
— Industry, Waste Heat Utilisation in, 749
— Ingots for Large Rotors, 422
— and Iron, Import Trade, 478
— — Nickel-Bearing, Extended Use of, 750
— — Industry, and Science, 751
— Manufacture. See *Metallurgy*
— Microstructure of. See *Microphotographs; Metallography*
— Mild, Fatigue Limit and Yield Point in, 231*. See 543. See LETTERS, 632*, 710*
— for Naval Engineering, 473, 486
— Nickel-Chromium, for Rotors, Properties of, 421. See 141
— Plates, Prices. See *Metal-Price Diagrams*
— Rails. See *Rails; Metal-Price Diagrams*
— Rolling Mills. See *Rolling Mills*
— Ropes. See *Wire Ropes*

Steel Sheets, Normalising and Box-Annealing of, 583*, 610
— — Piling, Zuyder Zee Reclamation Works, 762*, 821*
— Siemens-Martin, for Rotors, Properties of, 422. See 141
— Specifications and Physical Properties, 749
— Stress Distribution in. See *Stress*; *Tests* (*Materials*)
— Structures for Buildings, Canadian Specification, 811
— — Design of, Investigations of Building Research Board, 142
— — Simple, Practical Design of (Review), 676
— Tests of. See *Tests* (*Materials*)
— and Timber, Elementary Structural Problems in (Review), 452
— Works Plant, Lubrication of, 749
— — See *Works*
Stephens, H. O., on Large Power Transformers, 93
Sterilisation, Water, Catadyn Process, 301
Stevens, Col. J., Work of, 334
Stewart, E. G., on Functions of Coke Ovens, 742
Stewarts & Lloyds, Ltd., Craggs-Plummer Adjustable Steel Pit Prop, 212*
Stilgoe, H. E., on Work of the Water Engineer, 710
Stirling Boiler, Explosion of, 577
Stockdale, Dr. D., on the Composition of Eutectics, 383
Stockholm, Third International Congress for Applied Mechanics, 450
Stockton and Middlesbrough, Imports of Iron and Steel, 478
Stodola, Prof. A., Seventieth Birthday, Commemoration Volume (Review), 38
Stoker Firing, Barton Power Station Extension, Operating Results, 597, 684, 718, 739, 746
— Mechanical, Multiple-Retort (Westinghouse Electric and Manufacturing Co.), 121*
Stoking, Mechanical, and Pulverised Fuel, Relative Cost, 154
Stoney Sluices, Welland Ship Canal Reconstruction, 728*, 792*
Stop Valves. See *Valves*
Storage Lake, Amsteldiep, Zuyder Zee Reclamation Works, 762*
— and Shipment Plant, Potash, Antwerp, 305*, 365*
— of Steam. See *Steam Accumulators*
Stork, Dr. C. F., on Steam-Turbine Developments in the Netherlands, 267
Stourbridge Meeting, Society of Glass Technology. See *Glass Technology, Society of*
Stove Plates, Iron, History of (Review), 191
— Hot-Blast, Gas Burner for, 589*
Strain, Indicator, Airship Mooring (Cambridge Instrument Co., Ltd.), 584*. See 273*
— Meter, Huggenberger, 502*
— See also *Stress*
Strata, Disrupted (Review), 817
Stream-Lining of Motor-Car Bodies, 802
Street Railway. See *Tramways*
— See *Roads*
Strength of Materials. See *Stress* and *Tests* (*Materials*)
Stress, Alternating and Combined. See *Tests* (*Materials*)
— in Boiler Tubes, 474*, 527*. See LETTERS, 632*, 679, 711, 776
— Calculations, Statically-Indeterminate Structures (Review), 131
— in Coolidge Multiple-Dome Dam, 194*, 276*
— Creep, in High-Temperature Steam Plant, 265*, 327*. See 772*, 785*
— Determination in Curved Beams, Plaster Models for, 231
— in Dished-End Drums, 190*. See LETTER, 517. See also, 394
— Distributions in Notched Beams, 516
— — in Thick-Walled Cylinders under Internal Pressure, 785*
— in High-Pressure Boiler Tubes, 407, 417
— Initial, in Hard-Drawn Tubes, 65*
— Internal, in Heat-Treated Alloy Steels, 141. See 412
— in Large Rotors, 421*. See 141
— in Lock Gates, Welland Ship Canal Reconstruction, 339
— in Locomotive Firebox Stays and Plates, 30
— Optical Determination of. See *Optical*
— in Passenger Ships, 515. See LETTER, 572
— Repetitions. See *Alternating Stress* under *Tests* (*Materials*)
— Safe Range of, in Mild and High-Tensile Steels, 231*. See 543. See LETTER, 632*, 710*
— Static and Dynamic, in Railway Bridges, 754*
— in Welded Joints, 364*, 386*
— Working, and Ultimate Strength, Relations between, 543. See 231. See LETTER, 632*, 710*
— — in Wrought-Iron Chains, 241
Strickland, C. F., on Mandi Hydro-Electric Scheme, 815*
Strikes. See *Labour*; *Labour Notes*
Structural Engineering Industry, Position and Prospects, 307
— Engineers, Institution of, Brenforce Travelling Scholarship, 604
— Problems, Elementary, in Steel and Timber (Review), 452
Structures, Chromium-Copper Steel for, 642, 687*
— Ferro-Concrete. See *Ferro-Concrete*
— Marine, Deterioration in Sea Water, Report, 544
— Statically-Indeterminate, Stress Calculations (Review), 131
— Steel, for Buildings, Canadian Specification, 811
— — Design of, Investigations of Building Research Board, 142
— — Simple, Practical Design of (Review), 676
Submarine Boats. See *Warships*
Substations, Central Scotland Electricity Scheme, 599*
— Dalmarnock, 60,000 kv.-a. Transformers, 600*
— Hennigsdorf, Berlin, 7,500-kw. Diesel-Electric Generators, 411
Substations, Rocky River Hydro-Electric Plant, 97*
— Seco, 6,000-kw., Hetch Hetchy Water Supply, San Francisco, 137*
— Southern Ireland Electricity Scheme, 731*
— Yoker, Switchgear, 600*
Sugarloaf Dam. See *Eildon Dam*
Sugiyama, S., on Reservoirs for Hydro-Electric Power Generation, 267
Sullivan, H. W., Ltd., Sub-Standard Wavemeter, 87*
Sulphate Neutralisers and Dryers, Becker Coke-Oven Plant, Sheffield, 699*
Sulphurous Fumes from Power Stations, 741
Sulzer, R., on Vibration in Motorships, 551*. See 529
Sumitomo Steel Mill Co., Ltd., Japan, 19
Summer Meetings of Technical Societies, Value of, 801
Super-Conductivity of Copper Sulphide, 324
Super-Pressure Steam, Generation of, 58*
Supercharged Aero Engines, Boost Gauge for (Negretti & Zambra), 130
Supercharger, Büchi, for Diesel Engines, M.S. "Maron," Trials of, 280. See LETTER, 323, 418; M.S. "Dunbar Castle," 697
Supercharging in Aero Engines, 728. See LETTERS, 776, 838
Superheaters, Use on Locomotives, 626
— for 600-lb. Pressure Yarrow Boilers, 406*. See 416
— Tubes, Creep Phenomena in, 265*
— for "Wood" Steam Generator, 143, 149*, 177
Surbiton, Telephone Charges at, 416
Surface Condensers. See *Condensers*
— Grinding Machine. See *Grinding* under *Machine Tools*
Surveying, Geophysical, Seismograph for (Cambridge Instrument Co., Ltd.), 52*
— Instruments (E. R. Watts & Son, Ltd.), 130
Surveyors, Nomograph for (Cooke, Troughton & Simms, Ltd.), 315
Sutherland, Sir A. M., on Position of Shipping Industry, 258
Swan, Hunter, & Wigham Richardson, Ltd., Floating Dock for River Ganges, 13; H.M. Sloop "Folkestone," Launch, 250; 5-ton Cantilever Crane, 253*; Launch of H.M. Sloop "Scarborough," 379; Reconditioning of S.S. "Hobson's Bay," 541; Sloop "Hindustan," Launch, 702
Sweden, Electric Power Supply in, 92
— Västerås Power Station, Boiler Test, 155
Swedish Industries Fair, Gothenburg, 509
— State Railways, Electrification, Transmission Systems, 117
Swing Bridge. See *Bridge*
Swinton, A. A. C., the Late, 293
Swiss Federal Railways, 7,200-h.p. Electric Locomotive, 509. See *Addendum*, 637; High-Pressure Passenger Locomotive, Operating Results, 625
Switches, Motor-Starting. See *Motors, Electric*
Switchgear, Air-Break Starter for Three-Phase Motors (Airedale Electrical & Manufacturing Co., Ltd.), 32*. See *Erratum*, 46
— Alternating Current, Standard Specification, 321
— Central Scotland Electricity Scheme, 601*
— Circuit-Breaker, Air-Break, for Colliery Gate Ends (G. Ellison, Ltd.), 223*
— — Breaker, Delon (Westinghouse Electric & Manufacturing Co.), 152*, 174
— — Breaker Design, 173
— — Breakers for Electric Locomotives, 723
— — Breaker, Three-Phase Oil (Harland Engineering Co., Ltd.), 557*
— — Breaker, Triple-Pole Hand-Operated (Record Electrical Co., Ltd.), 224*
— 11,000-volt Cubicle Type (G. Ellison, Ltd.), 222*
— Explosion-Proof, Abnormal Pressures in, 477
— High-Power, Breaking Performance of, 173
— — Tension, Lots Road Power Station, 443
— Ironclad (Felten & Guilleaume Carlswerk A.-G.), 373*
— Rocky River Hydro-Electric Plant, 97*
— Royal York Hotel, Toronto, 278*
— Selector for Transformer Tap-Changer (Hackbridge Electric Construction Co., Ltd.), 217*
— Southern Ireland Electricity Scheme, 731*
— Switches and Circuit Breakers, Standard Specification, 54, 799
— Three-Phase, with Air Blow-Out (Siemens-Schuckertwerke A.-G.), 376*
— 11,000-volt, Vertical Plugging (British Thomson-Houston Co., Ltd.), 221*
Switzerland, Broadcasting Stations in, 385
— Road and Rail Competition, 709
Sydney, Australia, Ferro-Concrete Elevated Water Reservoir, 137
— Harbour Bridge, Erection of Main Arch Span, 495*, 533*
Symbols, Railway Signalling, Standard, 734
Symington, W., Work of, 333
Symonds, Capt. W., Work of, 33
Symons Medal, Award to Dr. G. C. Simpson, 148
Synchronous Condenser, Hydrogen-Cooled (General Electric Co.), 534*
Synthetic Fuels, Production of, 184
Systems, Shop. See *Works Management*

T.

TADDEI Concrete Silos, 432
Taintor-Gate Valves, Welland Ship Canal Reconstruction, 592*, 663*, 791*
Tajima, T., on Propelling Machinery for Trawlers, 186
Takeda, Prof. Y., on Low-Temperature Carbonisation of Korean Brown Coal, 184
Talking-Film Production, Optical Apparatus for, 823
Tanaka, B., on Propeller Turbines in Japan, 268
Tangyes, Ltd., Two-Stroke Vertical Oil Engine, 204*; 120-ton Hydraulic Three-Plate Press, 207*
Tank Experiments, Resistance and Form of Towed Barges, 531
Tank Experiments, Wave-Making Resistance of Ships, 532
— — —. See also *Ship Resistance*
— Froude Experimental, Research Fund Appeal, 323
— Locomotives. See *Locomotives*
— Ships, Motor. See *Motor*
— Steamers. See *Steamers*
Tapsell, H. J., on Nickel-Chromium Alloys for High Temperature, 780*, 811*. See 641
Tar Protection against Corrosion, Experiments on, 545
— Road, Preparation of, 742
— — Standard Specification, 71
Tariffs, Electrical, and Load Models, 835
Tasmania, Paper Manufacture in, 479
Tata Iron and Steel Co., Ltd., Rolling-Mill Plant, 103*
Tate, J., & Co., Electrically-Controlled Steam Valve, 198*
Tawresey, Rear-Admiral J. E., on Safety of Life at Sea, 263
Taxation, Motor, Influence on Petrol-Engine Design, 303*, 366. See LETTERS, 776, 808
Taylor Brothers' Steelworks, "Wood" Steam Generator at, 143, 149*, 177
Taylor, Dr. J. L., on Vibration in Ships, 529
Taylor, S., & Sons (Brierley Hill), Ltd., Gravity Boat Davit and Winch, 668*
Taylor, W., on Science in Works Management, 383
Tazawa, M., on Water-Turbine Development in Japan, 268
Teaching. See *Education*
Technical College and Education. See *Education*
— Institutions and Industry, 17
— Societies, Value of Foreign Meetings, 801
— — See also *Institutions* and PARAGRAPH INDEX
Technology, Electrical, Worked Examples in (Review), 562
— and Science, History of, International Congress, 568
Tee Beams, Ferro-Concrete, Design of, 591*
Telegraph, Engine-Room, Electrically-Operated (Hopkinsons, Ltd.), 392*
— Lines, Inductive Interference from Power Lines, 93, 351
Telegraphy, Pioneers of Electrical Communication (Review), 817
— and Telephony, Including Wireless Communication (Review), 275
— Wireless, Determining Bearings of Transmitting Stations, 675
— — Direction-Finder for Aircraft, 129
— — Elements of Radio Communication (Review), 191
— — Physical Research in, 805
— — Report, Report of Radio Research Board, 467
— — Sub-Standard Wavemeter (H. W. Sullivan, Ltd.), 87*
— — Yosami Transmitting Station, 19
— See also *Electricity* in PARAGRAPH INDEX
Telephone Charges at Surbiton, 416
— Lines, Inductive Interference from Power Lines, 93, 351
Telephony, Micro-Ammeters for (Cambridge Instrument Co., Ltd.), 54*
— Pioneers of Electrical Communication (Review), 817
— and Telegraphy, Including Wireless Communication (Review), 275
— Wireless, Broadcasting in Switzerland, 385
— — Elements of Radio Communication (Review), 191
— — Existence of Side-Bands, 676
— — Interference with Reception from Tramways, 250
— — Physical Research in, 805
— — Report of Radio Research Board, 467
— — Rotary Transformers for Receivers, 130
— — Sub-Standard Wavemeter (H. W. Sullivan, Ltd.), 87*
— See also *Electricity* in PARAGRAPH INDEX
Television, Present and Future, 343
Telford's Work in Scotland, 501
Temperature-Regulating Apparatus, Automatic (Drayton Regulator and Instrument Co., Ltd.), 136*
— Controller and Recorder, Automatic (Foster Instrument Co.), 213*
— — and Recorder, Cyclic (Drayton Regulator and Instrument Co., Ltd.), 214*
— Measurement. See *Pyrometer*
Tempering. See *Heat Treatment* under *Metallurgy*
Temple Meads Railway Station, Bristol, 605
Tenders, 14, 46, 78, 108, 138, 170, 200, 254, 284, 316, 346, 378, 410, 444, 478, 508, 540, 572, 604, 636, 670, 702, 734, 770, 798, 828
— Locomotive. See *Locomotive*
Tensile Tests. See *Tests* (*Materials*)
Tensometer, Huggenberger, 502*
Ternary Alloys. See *Alloys* under *Metallurgy*
Terzaghi, Dr. C., Experiments on Earth Pressure, 689*, 753*
Tesla Transformer, 750,000-volt (Metropolitan-Vickers Electrical Co., Ltd.), 314*
Testing Electrical Appliances in Canada, 669
— Equipment, Artificial Lightning (Ohio Insulator Co.), 455
— — for Transmission-Line Towers, 88
— Fuel, in Canada, 234
— Laboratory. See *National Physical*
— Machine, Alternating Stress, for Laminated Springs, 28*
— — Hydraulic, for Concrete Sleepers, 660
— — 30-ton and 50-ton, for Insulators, 634*
— — Tension and Torsion, 327*
— — See also *Tests* (*Materials*)
— Materials, American Society for, X-Ray Studies of Cupped Copper, by Prof. A. Phillips and G. Edmunds, 61
— — New International Association for, Zürich Congress, 1931, 439
— Plant, Earth Pressure, 689*, 753*
— Set, Railway Brake, (Heatly-Gresham Engineering Co., Ltd.), 208*
— See also *Tests* (*Materials*); *Trials*
Tests, Aeronautical. See *Aeronautics*
— Corrosion. See *Corrosion*
— Diesel Heavy-Oil Burner, 300*
— of High-Pressure Benson Boiler, 80*
Tests, Internal-Combustion Engine, Electrical Dynamometers for, 438*. See 226
— of Ljungström Air-Preheaters, 155
— 2,000-h.p. Krupp Turbine Locomotive 280*

Tests (Materials):

Alternating-Stress Tests, Laminated Springs, 28*
— — Tests, Lead and Alloys, 399, 423*
— — Tests, Mild and High-Tensile Steels, 231. See 543. See LETTERS, 632*, 710*
Clay, Bearing Capacity Tests, 639
Compression Test of Cement Mortars, 67*
Corrosion Tests, Aluminium Brasses, 398, 554
— — Electro-Deposited Coatings, 389*, 398. See LETTER, 454
Creep Tests, Steel under Simple and Compound Stresses, 265*, 327*
— — of Tubes and Cylinders, 772*, 785*, 818*
Extensometer, Huggenberger, 502*
— Lateral, 465*
Hardness Indicator, Monotron, 129, 252*
— Tests of Copper Alloys, 30
— — Metallic Magnesium, 394
— — Rockwell, Heat-Treated Steel Sheets, 584
— — Rolled Copper, 524*
— — Steels containing Chromium, 643, 680
Impact Tests, Silicon-Chromium Steel, 643, 682*
Mechanical Tests of Weld Metal, 427
Motor-Lorry Wheels, Static and Impact Tests, 95
Notched-Bar Impact Tests. See *Impact Tests* (above)
Oxidation Tests on Alloy Steel, 682*
Prolonged-Stress Tests, Nickel-Chromium Alloys, 641, 782*
Shatter-Test Apparatus for Coke, 745*
Strain Meter, Huggenberger, 502*
Strength of Materials (Review), 163
Stress Determination, Optical. See *Optical* — in Materials and Structures. See *Stress*
Tensile Tests, Aluminium Brasses, 398, 554
— — Bronze, 358
— — Cement Mortars, 67*
— — Copper Alloys, 30
— — Heat-Treated Steel Sheets, 584
— — at High Temperatures, 50
— — Metallic Magnesium, 394
— — Nickel-Chromium Alloys, 641, 780*, 811*
— — Rolled Copper, 523*
— — Siemens-Martin Steel, 422
— — Steels, containing Chromium, 643, 680
— — Wrought Iron for Chains, 241
— — Zinc-Base Die-Casting Alloys, 399, 429*. See LETTER, 517
Testing Machine, Alternating-Stress, for Laminated Springs, 28*
— — Hydraulic, for Concrete Sleepers, 660
— — Impact, for Motor-Lorry Wheels, 70, 95
— — for Insulators, 634*
— — Tension and Torsion, 327*
— Materials, New International Association for, Zurich Congress, 1931, 439
— Plant, Earth Pressure, 689*, 753*
Torque Tests, Zinc-Base Die-Casting Alloys, 399, 429*. See LETTER, 517
Tests, Psychological, for Fitness for Work, 320
— Static and Impact, of Motor Wheels, 95
— "Wood" Steam Generator, 149, 177
Text Books. See LITERATURE INDEX
Textile Machinery Industry, Position and Prospects, 145
Thames Barges, Towing Experiments, 531
— Floods Prevention, London County Council Report, 382
— Motor Tugs, Haarlem Shipbuilding Co., 178
— River, Blackwall Tunnel, Difficulties in Construction of, 238
— — Passenger Landing Stage, Tilbury, 678*
Thames Steam Tug and Lighterage Co., Ltd., Diesel-Engined Tug "Irande," 106
Thau, W. E., on Turbine Propulsion, 263
Theodolite, Test for Trunnion Axis, 521
Thermal Conductivity, Refractory Bricks, 391
— Efficiency, Barton Power Station Extension, 597*, 684*, 718*, 739, 745
— — of Distribution in Steam Pipes, 579, 587*, 650
— — Steam and Oil Locomotives, 110
— — of Steam Power Plants, 299, 746*
— — United States Power Plants, 154, 746*
— Expansion Tests, Steels containing Chromium, 683*
— Storage Plant, Electrical, Northern Chromium Co., Ltd., 94*
— Treatment, Metals. See *Heat Treatment* under *Metallurgy*
Thermionic Valves. See *Valves*; *Telegraphy, Wireless*; *Telephony, Wireless*
Thermo-Junction, Vacuo (Cambridge Instrument Co., Ltd.), 54
— Technical Institute, Russia, Boiler Experiments, 155
Thermodynamics, Callendar's Work on, 115
— Critical Point of Water, 1*. See 88*
— Properties of Steam, American Researches, 257
— Steam, High-Pressure, Operating Results, Barton Power Station Extension, 597*, 684*, 718*, 739, 745*
— — Properties at High Pressures and Temperatures, 89*
— Super-Pressure Steam, Generation of, 58*
— Surface of Nitrogen, Model of, 130
— Temperature and Pressure Losses in Steam Pipes, 587*, 650*
— Work of Prof. A. Stodola, 38
Thierry, J. W., on Zuyder Zee Reclamation Works, 655*, 759*, 821*. See 770. See LETTER, 743
"Thisbe," H.M. Destroyer, Trials of Gyro-Compass for Gunfire Control, 323
Thoma, Prof. D., on Hydraulic Losses in Bends, 268
Thompson, R. W. S., on Diversion of River Ashop, 301

Thorncliffe Coal Distillation, Ltd., Becker Coke-Oven Plant, 699*
Thornycroft, J. I., & Co., Ltd., Endurance Test, Marine Petrol Engine, 56; Diesel-Engined Tug "Irande," 106*
Threads, Screw, German Tolerances (Review), 562
— — Milling and Grinding Machines, D. Brown & Sons (Huddersfield), Ltd., 693*
— — Rolling, 721*. See *Errata*, 766
Throttle Valve. See *Valve*
Thrust Bearing. See *Bearing*
— of Propellers. See *Propellers; Aeronautics*
Thunderclouds, Electric Field Produced by, 669
Tides, Authorship of Article in Encyclopædia Britannica, 234, 263
Tilbury Passenger-Landing Stage, 678*
Tilting Derrick, Godavery Bridge Construction, India, 161*
Timber Fenders, Welland Ship Canal Reconstruction, 337*
— Home-Grown, Green and Seasoned, Report, 667
— Shuttering for Wall Monoliths, Entrance Lock, Ymuiden, North Sea Canal, 68*
— Standard Tests for, 63
— and Steel, Elementary Structural Problems in (Review), 452
— Unwatering Gates, Welland Ship Canal Reconstruction, 468*
Time Recorder for Machines (Gent & Co., Ltd.), 215*
Timing Apparatus for Falling Bodies (Griffin & Tatlock, Ltd.), 87
Tin Alloys. See *Alloys* under *Metallurgy*
— and Tin-plate Prices. See *Metal-Price Diagrams*
Tins, Bottoming Machine for, 373*
— Lidding Machine for, 374*
Tipping Gear, High-Lift, for Motor Lorries (Bromilow & Edwards, Ltd.), 618*
Titanium, Effect on Nickel-Chromium Alloys, 813*
Tobolla, J., on Influence of Load Factor on Power Production, 92; on Ruths Accumulators in Japan, 155
Tohoku Imperial University, Japan, Research Institute, 20
Tokyo Electric Co., Research Laboratory, 19
— Gas and Electricity for Domestic Use, 91
— Imperial University, Research Institutes, 19
— Sectional Meeting, World Power Conference. See *World Power Conference*
— World Engineering Congress. See *Engineering Congress*
Tools, Machine. See *Machine Tools*
— Permanent Way, Improvements in, 787
— Pneumatic. See *Machine Tools*
— Steel. See *Steel*
Toothed Gear. See *Gear; Gearing; Marine Propulsion*
Toronto, Royal York Hotel, Engineering Equipment of, 278*
Torpedo Boats and Destroyers. See *Warships*
Torsion Tests. See *Tests (Materials)*
Torsional Vibration of Marine Diesel Engine Shafting, 529, 551*
Totalisator, All-Electric (British Thomson-Houston Co., Ltd), 269*
Totten, A. I., on Economic Results of Railway Electrification, 117
Towed Barges, Resistance and Form of, 531
Towers, Ferro-Concrete, Den Oever Sluice System, Zuyder Zee Reclamation Works, 821*
— Fixed and Travelling, for Aerial Transporter, 629*
— Gate, Ferro-Concrete, Mocassin Creek Reservoir, Hetch Hetchy Water Supply, San Francisco, 125*
— Mooring, Airship, Cardington, 271*. See 584*
— — Airship, St. Hubert, Montreal, 842*
— Transmission Line, Central Scotland Electricity Scheme, 603*
— — Line, Hetch Hetchy Water Supply, San Francisco, 127*
— — Line, Testing Equipment, 88
Townend Ring for Aero Engines, 703
Towns, German, Steam and Water Heating of, 185
Toyoda Automatic Loom Works, Nagoya, Japan, 19
Trackless Trolley System, Road Traction. See *Railless*
Traction, Electric. See *Railways; Railless; Tramways*
Tractors, Agricultural, at Paris Agricultural Machinery Exhibition, 431
— and Motor Vehicles (Review), 162
— Use on Railways, 757
Trade, Agricultural Machinery Imports and Exports, 289
— Atlantic, Protection of, 111
— Australian, Report on, 228
— British Engineering Exports, Statistics, 777*
— — Exports and Empire Markets, 415
— — with Japan, 321
— China, Report on, 288
— Coal Exports, 258
— Copper, Imports of, 51
— Disputes. See *Labour; Labour Notes*
— Economic Conditions in Argentina, Report, 447. See LETTER, 517
— — Conditions in Austria, 674
— — Conditions in East Africa, 512
— — Conditions in Poland, 770
— Electrical Machinery, Imports and Exports, 51
— Empire, and Canadian Budget, 632. See *Erratum*, 683
— Engineering and Allied, Position and Prospects, 20, 51, 82, 114, 145, 176, 229, 260 289, 307.
— — Markets of the World, 777*
— Exhibition. See *Exhibition*
— Imports of Iron and Steel 478
— Japanese Imports and Exports, 321
— Locomotive, British and Foreign Exports, 229
— Machine Tool, Imports and Exports, 176
— Machinery Imports and Exports, 20, 51, 82, 114, 145, 176, 229, 260, 289, 307
— Marine Engines, British Exports, 260
Trade, Motor Cycles and Cycles, Imports and Exports, 114
— — Vehicles, Imports and Exports, 82
— New Zealand Imports and Exports, 57
— Shipping Industry, Position of, 258
— Textile Machinery, Imports and Exports, 145
— Unions. See *Labour; Labour Notes*
Train Ferries, Japanese Government Railways, 117
— See also *Railway*
Training. See *Education; Apprenticeship*
Tramways, Electric, Interference with Broadcast Receptions from, 250
— Motor Omnibuses and Railless-Electric Vehicles, Relative Advantages, 228
— See also PARAGRAPH INDEX
Tranmere Bay Boiler Explosion, Report, 577
Transformation Points, Metals. See *Metallurgy*
Transformers and Air Condenser for 1,000,000-volt Testing Set (Metropolitan-Vickers Electrical Co., Ltd.), 312*
— Bank for High-Voltage Testing, 455*
— 25,000 kv.-a., Barton Power Station Extension, 599
— Central Scotland Electricity Scheme, 600*
— Current, Bar Type (Everett, Edgcumbe & Co., Ltd.), 86
— Development in United States, 55
— Large, Design of, 93
— 30,000 kv.-a. Rocky River Hydro-Electric Plant, 97*
— Rotary, for Wireless Receivers (M.-L. Magneto Syndicate, Ltd.), 130
— Southern Ireland Electricity Scheme, 731*
— Tap-Changer (Hackbridge Electric Construction Co., Ltd.), 217*
— Tesla, 750,000-volt (Metropolitan-Vickers Electrical Co., Ltd.), 314*
— 1,000-kv. Testing, for Insulators, 634*
Transmission Dynamometer, Simple Form, 621*. See LETTERS, 743, 776
— Electric, Ship Propulsion. See *Marine Propulsion*
— Gear. See *Gear; Gearing; Marine Propulsion; Motor-Car Details*
— Heat, in Thick Cylinders under Pressure, 818*
— of Power. See *Marine Propulsion; Power Transmission*
Transport, Aerial. See *Aeronautics*
— Co-Ordination of, 383
— Institute of, Co-Ordination of Transport, by A. Davies, 82; Methods of Road Transport, by R. H. Wilkinson, 228; Annual Dinner, 383
— Ministry of, Experimental Road Work, 321; Report on Road Traffic Census, 1928, 414; Charing Cross Bridge Scheme, 640
— Motor. See *Road; Motor*
— Railway. See *Railway*
— Road and Rail, Co-Ordination of, 81, 708
— — See *Road; Motor; Railless*
Transporter, Coal, Aerial, with Travelling Tower (J. Pohlig A.-G.), 629*
Transverse Tests. See *Tests (Materials)*
Trap, Steam. See *Steam Trap*
Travelling Crane. See *Crane*
Trawlers, Propelling Machinery for, 186
Treasury Motor-Car Taxation Formula, Fallacy of, 303*, 366
Treaty of Naval Limitations, 575
Trenton Channel Power Station, Operating Results, 746*
Trials of First "Wood" Steam Generator, 143, 149*, 177. See LETTER, 263
— See also *Tests*
Trier Bros., Ltd., Lubricators, 225
Trolley, Trackless, Road Traction. See *Railless*
— Wires, Regulations for Use in Mines, 380
Tropics, Health in, Lectures on, 321
Trucks, Railway. See *Wagons*
— See also *Bogie*
Tsurumi Factory, Shibaura Engineering Works, Ltd., 18
Tubes, Boiler, Gilled, for Combustion Chambers, 421*
— — Heat Transmission through, 143, 149
— — Naval, Materials for, 473*, 486
— — and Superheater, 600-lb. Pressure Yarrow Boiler, Stresses in, 407, 416
— — Thickness of, 527*. See LETTERS, 632*, 679, 711, 776
— Brass and Copper, Hard-Drawn, Initial Stresses in, 65*
— Condenser, Leather Bullets for Cleaning, 718*
— — Naval, Materials for, 473*, 486
— Murray Fin, in "Wood" Steam Generator, 143, 149*
— Railways. See *Underground Railways*
— Sounding, Ridge Formation in, 676
— Superheater, Creep Phenomena in, 265*
— Thick, Temperature and Pressure Stresses in, 527*. See LETTERS 632*, 679, 711, 776
— — under High Pressure and Temperature, 772*, 785*, 818*
— See also *Pipes*
Tug, Diesel-Engined, "Irande" (J. I. Thornycroft & Co., Ltd.), 106*
— Motor, Thames, Haarlem Shipbuilding Co., 178
Tungsten, Effect on Nickel-Chromium Alloys, 811*
Tunisian Railway, Oil-Electric Locomotive, 624
Tunnel, Blackwall, Difficulties in Construction, 238
— Cable, under River Hooghly, 124
— Channel, Committee's Report, 381
— Construction, Hetch Hetchy Water Supply, San Francisco, 125*
— Hudson River, Difficulties in Construction, 238
— Kiln, Porcelain Insulator Manufacture, 634*
— Mandi Hydro-Electric Scheme, 815*
Turbine Blading, Naval, Materials for, 475, 486
— Exhaust-Steam, Bauer-Wach, 139, 156
— Hydraulic, Francis, Development of, 267
— — Propeller Type, in Japan, 268
— — Propeller and Kaplan Types, 268
— — Use in Japan, 268
— — 33,300-h.p., Vertical, Rocky River Hydro-Electric Plant, 97*
— — See also *Power Plant*
— Pumps. See *Pumps, Centrifugal*
Turbine, Steam, 20,000-kw. Accumulator, Charlotienburg, 764*
— — Application to Bore-Hole Pumping, 713*, 751*. See 710
— — Back-Pressure, 267
— — 40,000-kw., Barton Power Station Extension, Operating Results, 598*, 684*, 718*, 739, 745
— — Blading for. See *Blading*
— — Compound, Single-Reduction Gearing, 500*
— — Development by General Electric Co., 156
— — Geared, 2,000-h.p., Zoelly, for Krupp Locomotive (Escher, Wyss & Co.), 280*
— — 500-kw. Impulse (Greenwood & Batley, Ltd.), 779*. See *Erratum*. 798
— — Impulse, for Rotary Feed Pump (G. & J. Weir, Ltd.), 683*
— — Ljungström, 156
— — Locomotive, Progress of, 623
— — 15,000-kw., Lots Road Power Station, 443
— — Marine, Geared, and Turbo-Electric Drive, Comparisons, 263
— — Marine, S.S. "Statendam, 491*, 513
— — Report on Nozzles Research, 291*, 296*, 361*. See 319, 329
— — Overstressed Discs of, 142. See 422
— — Progress in United States, 56
— — Radial-Flow, for Large Outputs, 156
— — 150-h.p., Single-Wheel (Westinghouse Electric and Manufacturing Co.), 247*
— — Super-Pressure Steam for, 58*
— — 12,500-kw., Super-Pressure, Billingham Power Station, 350
— — Theory of (Review), 806
— — for Water Works, Economics of, 809*, 839*
— — Work of Prof. A. Stodola, 38
— — 2,250-kw., York Street Mills, Belfast, 797*
— — Zoelly, High-Pressure, 267
— — Zoelly, for Locomotives, 266
— — See also *Turbo-Generators*
— Steamers. See *Steamers; Warships*
Turbo-Electric System, Ship Propulsion. See *Marine Propulsion*
— Generator, 40,000-kw., Barton Power Station Extension, Operating Results, 598*, 684*, 718*, 739, 745
— — Large, Safety in, 421*. See 141
— — 15,000-kw., Lots Road Power Station, 443
— — Refrigerating Plant for, 268
— — Set, 500-kw. (Greenwood & Batley, Ltd.), 779*. See *Erratum*, 798
— — Steels for Rotors, 141. See 422
— — 2,250-kw., York Street Mills, Belfast, 797*
Turbulence, Gas, Effect on Cast Alloys, 357*, 384
Turning. See *Machine Tools*
Turret Lathes. See *Lathes* under *Machine Tools*
Tyne Commission Quay, North Shields, 332

U.

U.G.I. Contracting Co., Rocky River Hydro-Electric Development, 35*, 97*
Uganda and Kenya Railways and Harbours, Report, 82
Uhl River, North India, Hydro-Electric Scheme, 815*
Undercutting Tool, Well Foundation, Godavery Bridge, India, 160*
Underground Railways, London, and Charing Cross Bridge Scheme, 114
— — London, Reconstruction of Lots Road Power Station, 443*
Unemployment. See *Labour*
Union-Castle Mail Steamship Co., Ltd., M.S. "Dunbar Castle," 697
Unions, Trade. See *Labour; Labour Notes*
United States Bureau of Mines, Report on Efficiency of Grinding Mills, 24; Signalling from Cages in Mines, 54; Butane and Propane for Carburation of Water Gas, 148; Coal-Washing Investigations, 196; Investigation on Physiological Factors in Mine Ventilation, 295; Report on Accidents in Petroleum Industry, California, 324; Regulations for Use of Trolley Wires in Mines, 380; Report on Abnormal Pressures in Explosion-Proof Electrical Equipment, 477; Data on Metal-Mine Ventilation in 1929, 536; Effect of Abnormal Air Conditions on Mine Workers, 536; Experiments on Purification of Bauxite, 571; Report on Re-Forming Natural Gas in Water-Gas Generators, 679; Centrifugal Concentration, Theory and Experimental Results, 775
— — Bureau of Roads, Investigation of Impact Reactions of Motor-Lorry Wheels, 69, 95
— — Bureau of Standards, Researches on Properties of Steam, 257
— — Bureau of Statistics, Wages and Hours in Coal and Iron Industries, 252
— — Early Steamboats in, 333
— — Electric Power Stations, Operating Results, 746*
— — Electric Power in, 92, 124, 268
— — Electric Power Supply, Voltage and Frequency, 268
— — Government, Coolidge Multiple-Dome Dam, 193*, 276*, 368*
— — Great Lakes Bulk-Freighters, 262
— — High Buildings in, 581
— — Manufacture of Refractory Materials in, 525
— — Motor Taxation Formula, 303*, 366
— — Navy. See *United States* under *Warships*
— — Progress in Electrical Engineering, 55
— — Public Health Reports, Treatment of Sewage by Stream-Flow Aeration, 504
— — Rail and Road Competition, 708
— — Railways, Advances in, 626
— — Railway Electrification in, 117
— — Railways, Internal-Combustion Engine Locomotives on, 117
— — Railways. See also *Railways; Railroads*
— — Rainfall and Hydro-Electric Power, 124
United States, Shipbuilding on Great Lakes during War, 262
— — Steam Power Station Practice in, 154
— — See also *America*
Units, Metric, Conversion to British Units, 20
Universal Grinding Machine. See *Grinding Machine* under *Machine Tools*
University College, London (1826–1926) (Review), 98
— — London, Goldsmid Engineering Scholarship, 88
— of Illinois, Memoir on Plaster Models for Stress Determination, 231
— of Leeds, and Gas Research, 742
— of Michigan, Investigation of Bearing Capacity of Clays, 638; Wind-Tunnel Experiments on Motor Cars, 802
— of Tokyo, Research Institutes, 19
— See also *Education*
Unwatering Gates, Timber, Welland Ship Canal Reconstruction, 468*
Unwin, M. E., the Late, 568
Uplift, Hydrostatic, under Masonry Dams, 181*, 235*
Uytborch, E., on Production of Electrical Energy in Belgium, 92

V.

VACUUM Furnace, Large Induction, 781*
— Pump. See *Pump*
— Separating System, Pulverised Fuel, 826*
— Tube. See also *Valves, Thermionic; Telegraphy, Wireless; Telephony, Wireless*
Valves, Admission, Accumulator Steam Turbine, 766*
— Gas, Automatic, Airship "R.101", 273*
— Gear, Locomotive, Beardmore-Caprotti, London & North Eastern Railway, 133*
— — Rotary Cam Poppet, for Locomotives (Lentz Patents, Ltd.), 30*
— — Types used on Locomotives, 626
— High-Pressure, Electrical Operating Gear for (Limitorque Corporation), 249*
— Intake and Discharge, Welland Ship Canal Reconstruction, 592*, 663*
— Needle, Coolidge Multiple-Dome Dam, 370*
— Parallel-Slide (Kelly Co.), 250
— Steam, Electrically-Controlled (J. Tate & Co.), 198*
— — Multiport, Back-Pressure (Cochrane Corporation), 120*
— Stop, Cast-Iron, Explosion of, 453
— — Explosions in S.S. "Carnarvonshire" and S.S. "Pensilva," 493
— — High-Pressure, Toggle-Operated (Schutte & Koerting Co.), 652*
— — 7-in., 1,350-lb. Pressure (Edward Valve and Manufacturing Co.,), 249*
— — 1,350-lb. Pressure (Lunkenheimer Co.), 75*
— Thermionic, Development of, 805
— — See also *Telegraphy, Wireless; Telephony, Wireless*
— and Valve Gear. See also *Engines*
Vanadium, Effect on Nickel-Chromium Alloys, 812*
Vancouver and Peace River Railway, Proposed, 255
Vandyke Brown, Standard Specification, 509
Vapours and Liquids, Properties of, 1*. See 88*
Variable Speed Gear. See *Gear; Motor-Car Details*
Västerås Power Station, Boiler Test, 155
Vat, Mixing, for Porcelain Insulator Manufacture, 633*
Vehicles, Mechanical Transmission of Power on, 835
Ventilating System, Royal York Hotel, Toronto, 278*
Ventilation, Mine and General, Physiological Problems in, 295
— and Dust Suppression in Factories, Report, 577
— Mine and Works, 536
Viaducts, Kent and Leven, Reconstruction, 426
— Liskeard, Reconstruction of, 425
— See also *Bridge*
Vibration in Ships, Causes and Prevention, 529, 551*
— Testing Machine for Insulators, 635*
Vibrometer for Seismograph (Cambridge Instrument Co., Ltd.), 52*
"Viceroy of India," Turbo-Electric Liner, Performances, 513, 519*
Vickers-Armstrongs Ltd., H.M. Fleet Repair Ship "Resource" 12*; Turbo-Electric Liners for Peninsular & Oriental Steam Navigation Co., Ltd., 139; Trials of H.M. Destroyer "Arrow," 478; H.M. Submarines "Regulus," "Regent" and "Rover," Launch, 799
Victoria, Australia, Eildon Dam, Failure of, 134
— Lake, Traffic on, 82
Viozone, Ltd., Pyroversum Pyrometer, 379

W.

WADDELL, W., the Late, 604
Wadkin & Co., 9-in. Hand-Feed Planing and Jointing Machine, 748*
Wages. See *Labour*
Wagons, Motor. See *Motor Wagons; Tractors*
— Railway, Braking in Marshalling Yards, 724
— — 80-ton, for 3-ft. Gauge (Baguley (Engineers), Ltd.), 102*
Wall, A. T., on Co-Operation between Naval Architects and Marine Engineers, 482
— Construction, Ferro-Concrete, Entrance Lock, Ymuiden, North Sea Canal, 6*
— — Welland Ship Canal, 157*, 241*
— Core, Concrete, Impounding Dam, Welland Ship Canal Reconstruction, 791*
— — Ferro-Concrete, Mocassin Creek Dam, Hetch Hetchy Water Supply, San Francisco, 125*

Wall Monoliths, Timber Shuttering for, Entrance Lock, Ymuiden, North Sea Canal, 68*
— Retaining, Fifteen-Mile Falls Power Scheme, 689*
Wallsend Slipway & Engineering Co., Ltd., Bauer-Wach Exhaust-Steam Turbine, S.S. "City of Cambridge," 139
Walsh Island Dockyard, New South Wales, Floating Dock, 283*. See *Addendum*, 410
Walton Pumping Station, Economics of Reciprocating Engines and Turbines, 840
— Hall Avenue, Liverpool, Replacement of Railway Bridge, 696*
Wanderwerke A.-G., Milling Machine, 374*
War Work of Great Lakes Shipyards, 262
Ward-Leonard System of Electric Winch Control, 483
Warehouses for Potash Storage, Antwerp, 305*, 365*
Warfare, Naval. See *Warships*
Warren Frequency Meter for Power Stations, 86

Warships:

Admiralty and Early Steam Vessels, 498
— Director of Naval Construction, History of Office, 33
Cruiser Strength and Treaty of Naval Limitations, 111, 575
Destroyer Strength and Treaty of Limitations, 111, 575
Flotilla Leaders, Italian, Trials, 530, 568
French Navy and Treaty of Naval Limitations, 111, 575
— Submarine "Diane," Launch, 671
German Battleship "Ersatz Preussen," 175*
— Navy, Submarine Campaign of, 113
H.M. Destroyer "Active," 347
— — "Antelope," 536
— —"Anthony," Trials, 196
— — "Arrow," Trials, 478
— — "Blanche," Launch, 744
— — "Boreas," Launch, 798
— — "Thisbe," Trials of Gyro-Compass for Gunfire Control, 323
— Fleet Repair Ship "Resource," 12*
— Navy, Materials for Naval Engineering, 473*, 486
— — Royal Corps of Naval Constructors, Annual Dinner, 199
— — Surveyors and Constructors of, 33
— Ship "Lightning," History of, 498
— — "Rhadamanthus," Atlantic Voyage of, 691
— Sloop "Scarborough," Launch, 379
— — "Folkestone," Launch, 250
— Submarines "Regulus," "Regent," and "Rover," Launch, 799
Italian Navy, Cruiser and Destroyer Strength, 111
— — Trials of Flotilla Leaders, 530, 568
Japanese Navy and Treaty of Naval Limitations, 111, 575
Naval Engineering History, 333, 498
— Limitations, Treaty of, 575
— Powers, Cruiser and Destroyer Strength, 111, 575
— and Shipping Annual, Brassey's (Review), 500
Royal Indian Marine Sloop "Hindustan," Launch, 702
Submarine Crews, Escape Dress for, 259
— Large, Design of, 484. See LETTER, 776
— Stability of, 484. See LETTER, 776
— Strength and Treaty of Limitations, 575
— Theory of Compressed-Air Discharge from Reservoirs, 515
— Warfare, Protection Against, 113
United States Aeroplane Carrier "Saratoga," Trial Trip Data, 263
— — Cruiser "Salt Lake City," Boilers of, 292
— — Navy and Treaty of Naval Limitations, 575
See also *Naval* in PARAGRAPH INDEX
Washington Jubilee Meeting, American Society of Mechanical Engineers, 545
Waste Heat Utilisation in Steel Industry, 749
— Weir, Welland Ship Canal Reconstruction, 727*
Watanabe, K., on Coal Resources of Japan, 183
Water Board, Derwent Valley, Diversion of River Ashop, 301
— — Rand, Annual Report, 351
— Chlorinator (Royles, Ltd.), 216*
— Critical Point of, 1*. See 88*
— Engineers, Institution of, Award of Prizes, 347; London Meeting: Presidential Address, on Work of the Water Engineer, by H. E. Stilgoe, 710; Selection and Operation of Pumping Machinery for Waterworks Purposes, by F. E. F. Durham, 809*, 839*. See 710; Steam Turbine as Applied to Borehole Pumping, by J. F. Haseldine, 713*, 751*, 710; Annual Dinner, 710
— — Work of, 710
— Friction. See *Hydrodynamics; Ship Resistance.*
— Gas, Carburation with Butane and Propane, 148
— — Generators, Re-Forming Natural Gas in, 679
— Heaters. See *Feed-Water Heaters*
— Reservoir, Elevated, Ferro-Concrete, Sydney Australia, 137
— Rights, Problems Relating to, 805
— Sea, Concrete Hardening in, 67*
— Softening Plant, Royal York Hotel, Toronto, 279*
— Solvent Power at High Temperature, 258
— Sterilisation, Catadyn Process, 301
— Supply, Assessment of Compensation Water, 832
— — Domestic, De-Aerator for (Cochrane Corporation), 120*
— — Hetch Hetchy, San Francisco 125*. See 252
— — of Perth, Western Australia, 484
— — Scheme, Kano, Nigeria, 114
— — Steam Turbines for Bore-Hole Pumping, 713*, 751*. See 710
— — See also *Irrigation*
Water, Total Heat of, American Researches, 257
— Tube Boiler. See *Boiler*
— Turbines. See *Turbines, Hydraulic; Power Plant*
— Works, Selection and Operation of Pumping Machinery for, 710, 809*, 839
— — See also *Water Supply* and PARAGRAPH INDEX
Waterless Gasholder, Ipswich, 742
Waterloo Station, Southern Railway, Facilities for Underground Passengers, 114; Site for, 640
Waterside Power Station, Data on, 299
Waterways. See *Rivers; Canals*
Watson, Prof. D. M. S., on Flight of Pterodactyls, 643
Watsons (Metallurgists), Ltd., 30-ton Electric Steel-Melting Furnace, 360*
Watts, E. R., & Son, Ltd., Surveying Instruments, 130
Wave-Making Resistance of Ships. See *Ship Resistance*
— Mechanics and Nuclear Research, 371*, 438* 470*
— — and Radioactive Transmutation, 549*
— Seismic and Aerial, Produced by Meteor, 669
Wavemeter, Sub-Standard (H. W. Sullivan, Ltd.), 87*
Wearham Portable Piano Player, 180
Weather Cycles and Weather Recurrences, 148
— See *Meteorology*
Webb Concrete Gun, 126*
Weeks, E. G., on Low-Temperature Distillation in Relation to Power Production, 184
Weighing Machines, Sack, Potash Shipment Plant, Antwerp, 365*
Welding, H., Electrification of York Street Mills, Belfast, 795*
Weir, G. & J., Ltd., High-Pressure Air Compressors, 506*; Rotary Feed Pump with Steam and Electric Drive, 683*
Weirs, Regulating and Safety, Welland Ship Canal Reconstruction, 157*, 725*, 790*
— Waste, Welland Ship Canal Reconstruction, 727*
Welding, Arc, Lincoln Prize Papers (Review), 452
— of Chains, 241
— Engineers, Institution of, Training of Operators in the Welding and Cutting Industries, by S. Ryder, 349. See 387
— Fusion, Proposed Regulations, 382, 387, 427*
— Machine, Arc (A. Reyrolle & Co., Ltd.), 225*
— Operatives, Training of, 349, 387
Welds, Fusion, for Unfired Pressure Vessels, 349, 353, 362*, 382, 386*, 394*, 427
Welland Ship Canal, Canada, Reconstruction, 157*, 241*, 336*, 400*, 468*, 592*, 663*, 711*, 725*, 790*
Wellington Harbour, New Zealand, 779
Wells, Foundation, Dredging Gear, Godavery Bridge, India, 160*
— Drainage, Foundation, Entrance Lock, Ymuiden, North Sea Canal, 4*
— Pumps, Steam-Turbine Driven, 713*, 751*. See 710
Wemyss, Lord, Presidential Address to Institution of Naval Architects, 484
Werkspoor, Ltd., Pumping Machinery, Medemblik and Leemans Pumping Stations, 656*, 761*. See LETTER, 743
West Bromwich, Kenrick Technical College, Engineering Shop and Foundry, 60*
Western Australia, Water Supply of Perth, 484
Westinghouse Electric and Manufacturing Co., Mechanical Stoker, 121*; Deion Circuit Breaker, 152*, 174; 150-h.p. Single-Wheel Steam Turbine, 247*; Motor-Car Parking Machine, 814*
Wharf Cranes. See *Cranes*
— Crib-Work, Concrete, Harbour Works, Fort Churchill, Canada, 71
Wheels, Gear. See *Gears; Gearing; Marine Propulsion*
— Motor-Lorry, Impact Forces from, 69, 95
— Turning Lathe (W. Hegenscheidt A.-G.) 342*
Whipple, F. J. W., on the Great Siberian Meteor, 669
Whipple, R. S., on English Instrument Makers of the Eighteenth Century, 772
White, C. M., on a Simple Transmission Dynamometer. 621*. See LETTERS, 743, 776
— Metal. See *Alloys* under *Metallurgy*
— Star Motor Liner "Britannic," 836*
Whitfield, R., on Normalising and Box-Annealing of Sheets, 583*. See 610
Whitworth Scholarships, Regulations, 734
— Society, Annual Dinner, 416
Wiberg, O., on Radial-Flow Turbines for Large Outputs, 156
Wigley, W. C., on Ship-Wave Resistance, 532
Wild-Barfield Electric Furnaces, Ltd., Exhibits at Physical and Optical Societies' Exhibition, 128
Wilkinson, R. H., on Road Transport, 228
Williams, C. J. R., on Lyttelton Harbour, New Zealand, 332
Willwood Dam, Wyoming, Uplift Diagram, 182*
Wimperis, H. E., on Spin in Aeroplanes, 674
Winches, Electric, H.M. Fleet Repair Ship "Resource," 13
— — for Ships, Control Systems, 483
— Electro-Hydraulic, Airport of St. Hubert, Montreal, 844
— Hand and Electric, for Gravity Davit (S. Taylor & Sons (Brierley Hill), Ltd., 668*
Wind Power, Utilisation of, 268
— Resistance of Motor Cars, 802
— Tunnels. See *Aeronautics*
Windlasses, Electric, for Ships, Control Systems, 483
Winnipeg Airway Beacon, 701
Winsor, F. A., Centenary of, 740
Wire, Copper, for Electrical Machinery, Standard Specification, 57
— Rope Fenders, Welland Ship Canal Locks, 157
— Ropeway for Aerial Coal Transporter, 629*
— — Construction of Nag Hamadi Barrage, River Nile, 252
— — Lidgerwood, Hetch Hetchy Water Supply, San Francisco, 125*
Wire, Trolley, Regulations for Use in Mines, 380
Wireless Telegraphy. See *Telegraphy*
Wiring Rules Committee, Australian, 507
— Telephony. See *Telephony*
Witts, F. J., & Co., Wire-Drawing Dies, 130
Wohler's Tests. See *Alternating Stress* under *Tests* (*Materials*)
Women's Engineering Society, Pamphlet on Training Facilities for Women, 504
"Wood" Steam Generator, Experiences with, 143, 149*, 177. See LETTER, 263
Woodall-Duckham Vertical Retort and Oven Construction Co. (1920), Ltd., Becker Coke-Oven Plant, 699*
Woodworking Machinery Co., Inc., Combination Woodworking Machine, 688*
— — See *Machine Tools*
Woolwich Research Department Investigations on Aluminium Brasses, 398, 554*; Exhibits at Royal Society Conversazione, 644
— Royal Ordnance Factories, Production and Distribution of Steam in, 585*, 579, 618*, 650*
Working-Class Houses, Financial Provision, 707

Works:

Brentford Works, Pyrene Co., Ltd., Opening, 703
Gear-Cutting Works (D. Brown & Sons (Huddersfield), Ltd., 559*, 693*. See *Erratum*, 744
Power Transmission in Workshops, 835
Stourport Factory, Steatite and Porcelain Products, Ltd., 632*
Ventilation Problems in Works, 536
York Street Flax-Spinning and Weaving Co., Ltd., Electrification of Mills, 795*
Works Management, Industrial and Commercial Administration, Course at Leicester, 860
— — Science in, 383
— — Works of D. Brown & Sons (Huddersfield), Ltd., 696. See *Erratum*, 744
Workshops, Power Transmission in, 836
— Training. See *Apprenticeship; Education*
— See also *Works; Machine Tools*
World Engineering Congress in Japan. See *Engineering Congress*
— — Markets of, 777*

World Power Conference, Berlin:

Visits and Excursions, 449
Preliminary Review, 608
Registration Date, 671
Inaugural Proceedings, 804
Report on Electricity in the Household and Agriculture, 804
Report on Production and Preparation of Solid Fuels, 804
Report on Problems Relating to Water Rights, 805
Physical Space and the Ether Problem, by Prof. A. Einstein, 805
Report on Electricity in Crafts and Industry, 833
Report on Fuel, Power and Heat Economics in Individual Countries, 834
Report on Research Work, 834
New Forms of Rationalisation, by Prof. D. Serruys, 834
Report on World Problems of Power Supply Economics, 834
Report on Standardisation Problems and Rationalisation of Statistics, 834
Report on Education, 834
Report on Three-Dimensional Load Models and Current Tariffs, 835
Report on Economic Problems of High-Temperature Distillation, 835
Report on Power Supply on Ships, 835
Report on Gas Markets, 835
Report on Individual Problems of Power Supply in Different Countries, 835
Report on Mechanical Transmission of Power on Vehicles and in Workshops, 835
Place of Minerals in a Power-Sustained World, by Dr. H. F. Bain, 836

World Power Conference (Tokyo Sectional Meeting):

Visits and Excursions, 18
Summaries of Papers, 91, 117, 154, 183, 267

Central Heating of Towns:
Problems of Town Heating in Germany, by W. Eilrich, 185

Diesel Engines:
Development of Marine Diesel Engines, by H. H. Blache, 184
Developments of the Diesel Motor in Germany, by Dr. A. Nagel, 185
Diesel Engine in Japan, by M. Ino, 186
Oil-Burning Steamships and Motorships, by T. Kawamura, 185
Steam Engines and Diesel Engines for Trawlers, by T. Tajima, 186

Electrical Engineering:
Refrigerating Plants for Cooling Turbo-Generators, by L. Neu, 268
Utilisation of Wind Power, by L. Neu, 268
Voltage and Frequency, by R. E. Argersinger, 268
Mechanical Degree of Safety in Large Turbo-Generators, by H. Rickli, 421*. See 141

Electricity and Gas Supply:
Gas and Electricity for Domestic Use in Tokyo, by K. Gotoh, 91
Municipal Electric and Gas Enterprises in Japan, by K. Ogura, 92
Electric Power Enterprise of Japan, by S. Maehara and H. Mori, 92
Japan's Hydro-Electric Power, by C. Mori, 92
Fusenko Hydro-Electric Power Plant, by K. Moritza and Y. Kubota, 92
Production of Electrical Energy in Belgium, by E. Uytborch, 92

World Power Conference (Tokyo Sectional Meeting)—*continued.*

Recent Economic Developments of Electric Power, by E. W. Rice, 92
Household and Rural Electrification in Sweden, by W. D. Borquist, 92
Influence of Load Factor on Economy of Power Production, by J. Tobolla, 92
Mercury Inverter, by R. Mitsuda, 92
High-Voltage Mercury Arrester, by R. Mitsuda, 93
Balance between the Generation and Demand for Energy, by J. Gastpar, 93
Large Power Transformers, by F. F. Brand and H. O. Stephens, 93
Lightning and Power Transmission Lines, by M. C. Dauzere, 93
Interference of Power Lines on Aerial Communication Lines and Radio Reception, by R. Mitsuda and K. Kanaya, 93

Fuel, Coal and Oil, Carbonisation:
Coal Resources of Japan, by K. Watanabe, 183
Transportation and Distribution of Coal in Japan, by K. Nanjo, 183
Petroleum Resources of Japan, by Y. Chitani, 184
Japan's Oil Consumption for Power Uses, by K. Hashimoto, 184
Soft Coal as Domestic Fuel, by A. Naito, 184
Low-Temperature Carbonisation of Korean Brown Coal, by Prof. Y. Takeda and Prof. M. Kamo, 184
Low-Temperature Distillation and Power Production, by E. H. Smythe and E. G. Weeks, 184
Synthetic Fuels and Lubricating Oils, by Prof. A. W. Nash, 184
Power Supply of the Russian Industries, by S. A. Koukel-Krajewsky, 184
Combustion of Low-Grade Fuels in Russia, by Prof. L. K. Ramzin, 184

Hydraulic Turbines:
Development of the Francis Turbine, by J. Moser and E. Seitz, 267
Propeller and Kaplan Turbines, by Dr. W. Hahn, 268
Water Turbine Development in Japan, by M. Tazawa, 268
Utilisation of Low-Head Power Plants, by M. Hayashi, 268
Propeller Turbines in Japan, by B. Tanaka, 268
Hydraulic Losses in Bends, Elbows, Forks and Tees, by Prof. D. Thoma, 268

Marine Propulsion:
Developments of the Exhaust-Steam Turbine, by Dr. G. Bauer, 156
High-Pressure Steam for Marine Propulsion, by A. Spyer, 156
Ship Propulsion as Influenced by Modern Power-Plant Engineering, by A. Kennedy, Jr., and R. A. Beekman, 146

Materials:
Creep of Steel under Simple and Compound Stresses, by R. W. Bailey, 265*, 327*. See 772*, 785*, 818*

Pulverised Coal:
Developments in Pulverised-Coal Firing, by R. Jackson, 184
Pulverised Fuel and its Applications, by Dr. G. E. K. Blythe, 184
Pulverised Fuel for Boilers and Metallurgical and Chemical Processes, by H. W. Hollands and E. C. Lowndes, 185

Railway Electrification and Operation:
Transmission Plants for Railway Electrification of Swedish State Railways, by I. Ofverholm, 177
Economic Results of Railway Electrification, by A. I. Totten, 117
Twelve Funicular Railways of Japan, by E. Otsuka and Y. Hashiguchi, 117
Train Ferries of Japanese Government Railways, 117
Internal-Combustion Engines in North American Rail Transportation, by A. H. Candee, 117

Reservoirs and Dams:
Reservoirs for Hydro-Electric Power Generation, by S. Sugiyama, 267
Safety and Watertightness of Dams, by Dr. N. Kelen, 267. See *Erratum*, 411

Steam Generation:
Thermal Electric Plant, by F. S. Clark, 145
High-Pressure Steam, by F. H. Rosencrants, 154
Main Principles of Efficient Boiler-Plant Design, by Prof. L. K. Ramzin, 154
Relation between Furnace Heating Surface and Total Heating Surface in a Boiler, by Prof. T. Lindmark, 155
Regenerative Principle as applied to Air Preheaters, by C. A. Jacobsen, 155
Tests of Ljungström Air Preheaters, by A. Lysholm and H. Edenholm, 155
High Pressure and Temperature in Power Generation, by G. A. Orrok, 299

Steam and Hydro-Electric Plant:
Joint Operation of Hydro-Electric and Steam Power Plants, by S. Fukumaka, 154
Parallel Operation of Hydraulic and Steam Power in Central Japan, by I. Hirose, 145
Planning the Shinano-Gawa Hydraulic Power Plant and the Tokyo Steam-Power Station, 154

Steam Locomotive Development:
Zoelly Turbo-Locomotive, by Dr. H. Zoelly, 266
Heat Economy of the Steam Locomotive, by J. Buchli, 266

World Power Conference (Tokyo Sectional Meeting)—*continued.*

Steam Practice:
High-Pressure Steam in German Power Stations, by Dr. X. Mayer, 267
Two High-Pressure Zoelly Steam Turbines, by F. Flatt, 267
Developments of Electric Power Plants in Germany, by Prof. W. Bauer, 267
Back-Pressure and Bleeder Steam Turbines, by Prof. E. A. Kraft, 267
Steam-Turbine Developments in the Netherlands, by Dr. C. F. Stork, 267

Steam Storage:
Ruths Accumulators in the Power Industry, by Dr. J. C. Ruths, 155
Ruths Accumulator in Modern Steam Raising, by Prof. von E. Josse, 155
Storage of Steam, by Dr. E. G. Ritchie, 155

World Power Conference (Tokyo Sectional Meeting)—*continued.*
Ruths Steam Accumulator in Japan, by J. Tobolla, 155

Steam Turbine Developments:
Steam Turbine Development by the General Electric Co., Schenectady, by E. L. Robinson, 156
Double-Rotation and Axial Flow Turbines, by M. T. Lindhagen and A. Lysholm, 156
Radial-Flow Turbines for Large Outputs by O. Wiberg, 156

World Problems of Power Supply, 834
Worm Gear. See *Gear; Gearing*
Wright, L., on Protective Value of Electro-Deposited Coatings, 389*, 398. See LETTER, 454
— Lecture on Progress of Aircraft Engines, 738. See LETTERS, 776, 838
Wrought Iron. See *Iron*

X.

X-RAYS. See *Röntgen Rays*
Xylonite Models, Stress Determination. See *Optical*

Y.

YARDS, Marshalling, Speed Control in, 724
Yarrow Boilers, 600-lb. Pressure, Design and Performance, 406*. See LETTERS, 487, 519, 571
Yawata, Japanese Government Steel Works, 19
Year Books. See LITERATURE INDEX
Ymuiden Entrance Lock, North Sea Canal, 3*, 67*
Yoker Substation, Switchgear, 600*
York Street Flax-Spinning and Weaving Co., Ltd., Belfast, Electrification of Mills, 795*
Yorkshire Patent Steam Wagon Co., Boiler and Engine for Steam Rail Coach, 716*
Yosomi Wireless Station, Japan, 19
Yunnan, Mineral Resources of, 32

Z.

ZEISS, C., Exhibits at Physical and Optical Societies' Exhibition, 130; Optical Measuring Machine, 236.* See 285
Zeppelin Airships. See *Airships* under *Aeronautics*
Zinc Alloys. See *Alloys* under *Metallurgy*
— Corrosion of, 134
— Diffusion in Copper, 398
— Doler, Properties of, 122
— Electro-Deposited, Protective Value of, 389*, 398
— Prices. See *Metal-Price Diagrams*
Zoelly, Dr. H., on the Zoelly Turbine Locomotive, 266
— Steam Turbines, High-Pressure, 267
Zürich Congress, 1931, of New International Association for Testing Materials, 439
— Meeting of Institute of Metals. See *Metals, Institute of*
Zuyder Zee Reclamation Works, 655*, 759* 770, 821*
Zweigbergk, T. von, the Late, 418

ONE-PAGE AND TWO-PAGE PLATES.

PLATE

I. New Entrance Lock at Ymuiden; North Sea Canal (between pages 6 and 7).

II. Pile-Driving Plant for Adelaide Harbour (between pages 56 and 57).

III. Caissons for Ymuiden Entrance Lock; North Sea Canal (between pages 68 and 69).

IV. 35-in. Reversing, Roughing Rolling-Mill Plant for India (facing page 104).

V. 35-in. Reversing, Roughing Rolling-Mill Plant for India (between pages 104 and 105)

VI. 35-in. Reversing, Roughing Rolling-Mill Plant for India (facing page 105).

VII. Hetch Hetchy Water Supply of the City of San Francisco (facing page 124).

VIII. Hetch Hetchy Water Supply of the City of San Francisco (between pages 124 and 125).

IX. Hetch Hetchy Water Supply of the City of San Francisco (between pages 124 and 125).

X. Hetch Hetchy Water Supply of the City of San Francisco (facing page 125).

XI. Welland Ship Canal, Canada (facing page 156).

XII. Welland Ship Canal, Canada (between pages 156 and 157).

XIII. Welland Ship Canal, Canada (between pages 156 and 157).

XIV. Welland Ship Canal, Canada (between pages 156 and 157).

XV. Welland Ship Canal, Canada (facing page 157).

XVI. British Air Ministry's Airship "R 101" (between pages 186 and 187).

XVII. Welland Ship Canal, Canada (facing page 240).

XVIII. Welland Ship Canal, Canada (between pages 240 and 241).

PLATE

XIX. Welland Ship Canal, Canada (facing page 241).

XX. Royal York Hotel of the Canadian Pacific Railway Co., Toronto (between pages 278 and 279).

XXI. Potash Storage and Shipment Plant at Antwerp (between pages 306 and 307).

XXII. 82-ft. Lock Gates for the Welland Ship Canal, Canada (facing page 336).

XXIII. 82-ft. Lock Gates for the Welland Ship Canal, Canada (between pages 336 and 337).

XXIV. Lock Gate Details, Welland Ship Canal, Canada (facing page 337).

XXV. Potash Storage and Shipment Plant at Antwerp (facing page 364).

XXVI. Potash Storage and Shipment Plant at Antwerp (facing page 365).

XXVII. Exhibits at Leipzig Fair (facing page 374).

XXVIII. Automatic and Capstan Lathes at Leipzig Fair (facing page 375).

XXIX. Welland Ship Canal, Canada; Details of Lock Gates (between pages 400 and 401).

XXX. Circulating Water Culverts for Portishead Generating Station (between pages 432 and 433).

XXXI. 44-ft. Timber Unwatering Gates; Welland Ship Canal, Canada (facing page 468).

XXXII. Lock Gates; Welland Ship Canal, Canada (facing page 469).

XXXIII. Junkers Multi-Cylinder Heavy-Oil Aero-Engine (facing page 472).

XXXIV. Junkers Multi-Cylinder Heavy-Oil Aero-Engine (facing page 473).

XXXV. Sydney Harbour Bridge, Sydney, New South Wales (facing page 496).

XXXVI. Sydney Harbour Bridge, Sydney, New South Wales (between pages 496 and 497).

PLATE

XXXVII. Sydney Harbour Bridge, Sydney, New South Wales (facing page 497).

XXXVIII. Sydney Harbour Bridge, Sydney, New South Wales (facing page 532).

XXXIX. Centre Joint of Lower Chord; Sydney Harbour Bridge (between pages 532 and 533).

XL. Centre Joint of Top Chord; Sydney Harbour Bridge (between pages 532 and 533).

XLI. Sydney Harbour Bridge, Sydney, New South Wales (facing page 533).

XLII. Works of Messrs. David Brown & Sons (Huddersfield), Ltd. (facing page 560).

XLIII. Works of Messrs. David Brown & Sons (Huddersfield), Ltd. (facing page 561).

XLIV. Re-Girdering of the Lower Sone Bridge; East Indian State Railway (facing page 564).

XLV. Re-Girdering of the Lower Sone Bridge; East Indian State Railway (facing page 565).

XLVI. Intake Valve Arrangements; Welland Ship Canal, Canada (between pages 592 and 593).

XLVII. Welland Ship Canal, Canada; Intake Valve Arrangements (facing page 594).

XLVIII. Extensions of the Barton Power Station; Manchester Corporation (facing page 595).

XLIX. Central Scotland Electricity Scheme (facing page 602).

L. Central Scotland Electricity Scheme (facing page 603).

LI. Aerial Coal Transporter, with Travelling Tower, at Beuthen, Silesia (between pages 628 and 629).

LII. Zuyder Zee Reclamation Works; Medemblik Pumping Station (facing page 657).

LIII. Zuyder Zee Reclamation Works; Medemblik Pumping Station (between pages 657 and 658).

PLATE

LIV. Zuyder Zee Reclamation Works; Medemblik Pumping Station (facing page 658).

LV. Works of Messrs. David Brown & Sons (Huddersfield). Ltd. (facing page 694).

LVI. Works of Messrs. David Brown & Sons (Huddersfield), Ltd. (between pages 694 and 695).

LVII. Works of Messrs. David Brown & Sons (Huddersfield), Ltd. (between pages 694 and 695).

LVIII. Replacement of a Railway Bridge; Walton Hall Avenue, Liverpool (facing page 695).

LIX. Welland Ship Canal, Canada (facing page 728).

LX. Welland Ship Canal, Canada (between pages 728 and 729).

LXI. Welland Ship Canal, Canada (facing page 729).

LXII. Zuyder Zee Reclamation Works; North-West Enclosure (facing page 760).

LXIII. Zuyder Zee Reclamation Works; North-West Enclosure (facing page 761).

LXIV. Ruths Steam Accumulators at Charlottenburg (facing page 764).

LXV. Ruths Accumulator Installation at Charlottenburg (facing page 765).

LXVI. Welland Ship Canal, Canada (facing page 790).

LXVII. Welland Ship Canal, Canada (facing page 791).

LXVIII. Electrification of the York Street Flax-Spinning Mills, Belfast (facing page 796).

LXIX. Electrification of the York Street Flax-Spinning Mills, Belfast (facing page 797).

LXX. Zuyder-Zee Reclamation Works; Lock and Sluices in Main Embankment (between pages 822 and 823).

LITERATURE.

A.B.C., Aerial, 63
Accounting, Storekeeping and Perpetual Inventory, by C. H. Smith, 751
Accounts, Gas Companies', "Gas World" Analysis, 172
Aeronautics, Adlershof Experimental Station for Aerial Navigation, Year Book, 1929. Edited by Dr.-Ing. W. Hoff, O. v. Dewitz, and Dr.-Ing. G. Madelung, 100
Aerial A.B.C., 63
Africa, South and East, Year Book and Guide, 147
Air Lift Pumping, Oil Wells, Pocket Book, by R. Sterling, 752
Aircraft, All the World's, 10
Aldershof Experimental Station for Aerial Navigation, Year Book, 1929, Edited by Dr.-Ing. W. Hoff, O. v. Dewitz, and Dr.-Ing. G. Madelung, 100
All the World's Aircraft, 10
Almanacs and Calendars, 43, 105, 147, 171, 326, 441
American Institute of Steel Construction Code, 752
American Society of Mechanical Engineers, Lincoln Prize Papers on Arc Welding, Edited by E. P. Hulse, 452
American Society for Testing Materials, Complete Tentative and Supplementary Standards, 550
Analysis, Metallurgical, Select Methods, by W. A. Naish and J. E. Clennell, 162
Annual, Naval and Shipping, Brassey's, 1930, Edited by Comdr. C. N. Robinson, 500
Annuals and Year Books, 10, 43, 105, 147, 234
Anthracite Mines of Pennsylvania, Strength Tests of Roof Supports, 550
Applied Geophysics in the Search for Minerals, by A. S. Eve and Dr. D. A. Keys, 39
Arc Welding, Lincoln Prize Papers, American Society of Mechanical Engineers, Edited by E. P. Hulse, 452
Architects' and Surveyors' Pocket Diary, 105
Aufbereitung von Kohle und Erzen, by A. E. Liwehr, 192
Aufgaben aus dem Wasserbau Angewandte Hydraulik, by Dr.-Ing. O. Streck, 817

BAUTENSCHUTZ, Der, 556
Belt-Fastener Tests, 541
Belting, Power Transmission by, 541
Berechnung Statisch unbestimmter Systeme, Vol. I. Der Einfache Rahmenträger, by Prof. J. Reiger, 131
Berechnung und Verhalten von Wasserrohrkesseln, by F. Münzinger, 100
Bijdrage tot de Kennis van den Invloed van de Getijbeweging op de Stijghoogte van het Grondwater, by J. H. Steggewentz, 784
Birmingham City Handbook, 697
Birmingham Exchange Directory, 767
Blast Furnaces. See *Furnaces*
Boats, Power, Model, by E. W. Hobbs, 752
Boiler House, Modern, by H. S. Webster, 419
Boilers, Water-Tube, Calculations and Behaviour, by F. Münzinger, 100
Books, New, Notes on, 264, 419, 440, 505, 550, 751, 784
Books Received, 14, 46, 78, 108, 138, 200, 254, 284, 346, 378, 410, 508, 540, 572, 636, 670, 702, 734, 766, 798, 828
Brassey's Naval and Shipping Annual, 1930, Edited by Comdr. C. N. Robinson, 500
Bridges of Pittsburg, by J. White amd M. W. Bernewitz, 419
British Columbia Minerals and Metals, 300
Buildings, Protection of (Der Bautenschutz), 556
Building Science, Experimental, by Manson & Drury, 505
Building, Stairbuilding and Handrailing, by J. S. Dowsett, 505

CABLES, High-Voltage, Theory and Practice of their Design and Operation, by P. Dunsheath, 100
Calculations, General Engineering, Pocket Book, by Ing. B. M. Kororski, 784
Calendars and Almanacs, 43, 105, 147, 171, 326, 441
Cambridge Five-Figure Tables, by F. G. Hall and E. K. Rideal, 440
Canada, British Columbia, Minerals and Metals, 300
Cast Irons, Sampling and Analysis, 32
Castings, Working Drawings of, 360
Chemical Engineering and Chemical Catalogue, 828
Chemical Engineers, Institution of, Annual Report, 556
Chilled-Iron Rolls, Manufacture, by A. Allison, 274
Clubs, 1930, Edited by E. C. Austen-Leigh, 105
Coal Mines, Anthracite, Pennsylvania, Tests of Strength of Roof Supports, 550
Coal and Ore Dressing, by A. E. Liwehr, 192
Coal Production and Shipment, 88
Cold Storage Diary, 43
College, University, London, 1826-1926, by H. H. Bellot, 98
Colliery Guide and Directory, North of England, 779
Colliery Manager's Pocket Book, 43
Colliery Year Book and Directory, 799
Commercial Annual Review, 234
Concrete Making, Basic Principles of, by F. R. McMillan, 677
Concrete, Reinforced, Construction, Part III, by C. Kerston, 264
Concrete Year Book, 234
Contractors, Electrical, Year Book, 43

DEFINITIONS and Formulæ for Students, 440
Deutschen Gewindetoleranzen, by Prof. Dr. G. Berndt, 562
Diary, Architects' and Surveyors', 105
Diary, Cold Storage, 43
Diary and Reference Book, Scientists', 43
Diaries and Pocket Books, 10, 43, 105
Directory, Birmingham Exchange, 767
Directory of French Mines, 773
Directory and Guide, Colliery, North of England, 779
Directory and Handbook, Electrical Trades, 234
Directory of Merchants, Manufacturers and Shippers of the World, Kelly's, 784
Directory of Paper Makers, 829
Directory of Shipowners, Shipbuilders and Marine Engineers, 541
Directory and Year Book, Colliery, 799
Disrupted Strata, by M. H. Haddock, 817
Drawing, Engineering, Theory, with Applications, by F. Kerekes, 39
Drawings, Working, of Castings, 360
Drills, Rock, Steel, Treatment of, 364

EARTHWORKS, Measurement, Distribution and Cost, by Prof. W. Müller, 505
Eisenbetonbau, Der, Part III, by C. Kerston, 264
Eisenhütte, Taschenbuch fur Eisenhüttenleute, 419
Electric Cables, High-Voltage, Theory and Practice of their Design and Operation, by P. Dunsheath, 100
Electric Generators and Batteries for Motor Vehicles, by A. Mattes and Dr. F. Trautmann, 440
Electric Locomotives for Mines, 696
Electric Overhead Power Lines, by W. Morecombe, 440
Electrical Communication, Pioneers, of, by R. Appleyard, 817
Electrical Contractors' Year Book, 43
Electrical Engineering Formulæ and Definitions, by P. Kemp, 440
Electrical Engineering, Heavy, Handbook on, by Rziha & Seidener, 752
Electrical Engineering, Problems in, by Prof. S. P. Smith, 264
Electrical Methods in Mineral Prospecting, Depth Attainable, by A. S. Eve, Dr. D. A. Keys and F. W. Lee, 752
Electrical Pocket Book and Diary, "Practical Engineer," 10
Electrical Technology, Parts I and II, by L. Donati and G. Sartori, 677
Electrical Technology, Worked Examples, by F. Peasgood and H. H. Boyland, 562
Electrical Trades Directory and Handbook, 234
Electrical Undertakings, Garcke's Manual, 10
"Electrician" Annual Tables of Electricity Supply Undertakings, 784
Electricity Supply and Distribution, Rules, Regulations and Specifications, 505
Electricity Supply Undertakings, "Electrician" Annual Tables, 784
Electricity, Telegraphy and Telephony, Including Wireless Communication, by Dr. E. Mallett, 275
Eletrotecnica, Parts I and II, by L. Donati and G. Sartori, 677
Energie und Energiewirtschaft, by F. Brock, 264
Energy and its Utilisation, by F. Brock, 264
Engineering Branch, Royal Navy, Biography of W. Stoddart, by L. Hanbridge, 784
Engineering Congress, Tokyo, Publication of Proceedings, 828
Engineering Definitions and Formulæ for Students, 440
Engineering Drawing Theory, with Applications, by F. Kerekes, 39
Engineering, Wonders of, by E. Hawks, 264
Engines, Heat, Formulæ and Definitions, by A. Rimmer, 440
Engines, Heat, Theory of, by Prof. A. Loschge, 806
Engines, Heat, Work of Dr. A. Stodola, 38
Experimental Building Science, by Manson & Drury, 505

FERRO-CONCRETE Construction, Part II, by C. Kerston, 264
Fighting Ships, Jane's, 1929, 10
Five-Figure Tables, Cambridge, by F. G. Hall and E. K. Rideal, 440
Ford Car, Model A, Construction, Operation and Repair, by V. W. Page, 440
Formulæ and Definitions for Students, 440
Foundry Materials, Sampling and Analysis, 32
Foundry Work, Cast Iron, High-Grade, and the Physico-Metallurgical Principles of its Production, by Prof. E. Piwowarsky, 453
Foundry Work, Manufacture of Chilled-Iron Rolls, by A. Allison, 274
Foundrymen's Handbook, 419
French Hispano-Suiza Technical Bulletin, 784
French Mines, Directory of, 773
Furnaces, Blast, Practice, Vol. III. Operation and Products, by F. Clements, 192
Furnaces, Industrial, Technique, by A. Hermansen, 131

GARCKE'S Manual of Electrical Undertakings, 10
Gas Air-Lift Pocket Book, by R. Stirling, 752
Gas Companies' Accounts, "Gas World" Analysis, 172
Gaseous Combustion at High Pressures, by Drs. W. A. Bone, D. M. Newitt and D. A. T. Townend, 561
Gauges and Fine Measurements, Vols. I and II, by F. H. Rolt, 806
Gauging, German Screw-Thread Tolerances, by Prof. Dr. G. Berndt, 562
Generators and Batteries for Motor Vehicles, by A. Mattes and Dr. F. Traurmann, 440
Geology, Disrupted Strata, by H. M. Haddock, 817
Geology, Engineering, by Drs. K. A. Redlich and K. V. Terzaghi and D. R. Kampe, 162
Geophysics, Applied, Depth Attainable by Electrical Methods, by A. S. Eve, Dr. D. A. Keys and F. W. Lee, 752
Geophysics, Applied, in Search for Minerals, by A. S. Eve and Dr. D. A. Keys, 39
German Screw-Thread Tolerances, by Prof. Dr. G. Berndt, 562
Great Western Railway Ports, 504
Guide and Directory, Colliery, North of England, 779

HACK-SAW Blades, Price List, 505
Handbook, Iron and Steel, Eisenhütte, 419
Handrailing and Stairbuilding, by J. S. Dowsett, 505
"Harco Magazine," House Journal, 275
Harvey, G. A., & Co., Ltd., House Journal, 275
Heat Economy in Railway Work, by Dr.-Ing. F. Landsberg, 505
Heat Engines. See *Engines*
Hilfsbuch für Betriebsberechnungen, by Ing. B. M. Kororski, 784
Hispano-Suiza, French, Technical Bulletin, 784
Hochwertiger Grauguss und die Physikalisch-Metallurgischen Grundlagen seiner Herstellung, by Prof. E. Piwowarsky, 453
Hydraulics, Applied, Constructional Problems, by Dr.-Ing. O. Streck, 817

INDUSTRIAL Furnace Technique, by A. Hermansen, 131
Industrial Storekeeping, Accounting and Perpetual Inventory, by C. H. Smith, 751
Industry, Structural Steel, Facts about, American Institute of Steel Construction, 752
Ingenieur Geologie, by Drs. K. A. Redlich and K. V. Terzaghi and D. R. Kampe, 162
Irons, Cast, Sampling and Analysis, 32
Iron and Non-Ferrous Metals, Properties, of, Textbook, by Prof. F. Sauerwald, 275
Iron and Steel Handbook, Eisenhütte, 419
Iron and Steel Trades, 1929, 168
Iron Stove Plates, Artistic, by Dr. A. Kippenberge , 192
Italian Royal Train, 573

JAHRBUCH, 1929, der Deutschen Versuchsanstalt für Luftfahrt, E. V. Berlin-Adlershof, Edited by Dr.-Ing. W. Hoff, O. v. Dewitz, and Dr.-Ing. G. Madelung, 100
Jane's Fighting Ships, 1929, 10

KELLY'S Directory of Merchants, Manufacturers and Shippers of the World, 784
Kinematics of Machines, by G. L. Guillet, 38
Kunst der Offenplatten, Die, by Dr. A. Kippenberger, 192

LABORATORY, National Physical, Report, 814
Lathes, Combination Turret, Operator's Handbook, 440
Lehrbuch der Metallkunde des Eisens und der Nichteisenmetalle, by Prof. F. Sauerwald, 275
Lichtmaschine und Batterie (Automobiltechnische Bibliothek), by A. Mattes and Dr. F. Trautmann, 440
Lighting Generators and Batteries for Motor Vehicles, by A. Mattes and Dr. F. Trautmann, 440
Lincoln Prize Papers on Arc Welding, American Society of Mechanical Engineers, Edited by E. P. Hulse, 452
L'Industrie Minière, by G. Moreau, 419
Liverpool and Manchester Railway, Centenary History, by C. F. Dendy Marshall, 130
Locomotives, Storage-Battery, for Mines, 696
London, Port of, Peepshow, by A. G. Linney 440
London University College, 1826-1926, by H. H. Bellot, 98
Lubrication, Principles and Practice, by Prof. A. W. Nash and Dr. A. R. Bowen, 752

MACHINE Design, Lectures on, Part IV, by Prof. ten Bosch, 550
Machine Elements, by Dr.-Ing. E. von En e, 550
Machine Tools, Operator's Handbook for Combination Turret Lathes, 440
Machines, Kinematics of, by G. L. Guillet, 38
Manchester and Liverpool Railway, Centenary History, by C. F. Dendy Marshall, 130
Manufacturers, Shippers and Merchants of the World, Kelly's Directory, 784
Marine Engineering Formulæ and Definitions, by E. Wood, 440
Marine Engineers, Shipowners and Shipbuilders', Directory of, 541
Marine Propulsion, Model Power Boats, by E. W. Hobbs, 752
Maschinenelemente, by Dr.-Ing. E. von Ende, 550
Massenermittlung, Massenverteilung und Kosten den Erdarbeiten, by Prof. W. Müller, 505
Materials, Strength of, by J. O. Draffin, 163
Mathematical Tables, Cambridge Five-Figure, by F. G. Hall and E. K. Rideal, 440
Mathematics, Practical, Formulæ and Definitions, by L. Toft, 440
Mathematics, Standard Tables, Square Roots, by Prof. L. M. Milne-Thomson, 550
Mathematics, Seven-Place Natural Tables, by H. C. Ives, 505
Measurements, Fine, and Gauges, Vols. I and II, by F. H. Rolt, 806
Mechanical Engineers, American Society of, Lincoln Prize Papers on Arc Welding, Edited by E. P. Hulse, 452
Mechanical Pocket Book and Diary, "Mechanical Engineer," 10
"Mechanical World" Year Book, 234
Mechanics, Applied, Formulæ and Definitions, by E. H. Lewitt, 440
Mercantile Year Book, 683
Merchants, Manufacturers and Shippers of the World, Kelly's Directory, 784
Metals, Non-Ferrous, and Iron, Properties of, Textbook, by Prof. F. Sauerwald, 275
Metallurgical Analysis, Select Methods, by W. A. Naish and J. E. Clennell, 162
Metallurgical Practice, Outline of, by C. R. Hayward, 806
Metallurgy, Blast-Furnace Practice, Vol. III. Operation and Products, by F. Clements, 192
Metallurgy, Cast Iron, High-Grade, and the Physico-Metallurgical Principles of its Production, by Prof. E. Piwowarsky, 453
Metallurgy, Cast Irons, Sampling and Analysis, 32
Metallurgy, Foundrymen's Handbook, 419
Metallurgy, Industrial Furnace Technique, by A. Hermansen, 131
Metallurgy, Iron and Non-Ferrous Metals, Properties of, by Prof. F. Sauerwald, 275
Metallurgy, Iron and Steel Handbook, Eisenhütte, 419
Metallurgy, Principles of, by J. L. Bray, 561
Metrology, Gauges and Fine Measurements, Vols. I and II, by F. H. Rolt, 806
Milan Motor Show, Report, 829
Mines, French, Directory of, 773
Mines, Storage-Battery Locomotives for, 696
Mines, Ventilation of, Generation of the Air Current, by Prof. H. Briggs, 264
Minerals and Metals, British Columbia, 300
Mineral Prospecting, Depth Attainable by Electrical Methods, by A. S. Eve, Dr. D. A. Keys, and F. W. Lee, 752
Minerals, Prospecting for, Geophysical Methods, by A. S. Eve and Dr. D. A. Keys, 39
Mining, Disrupted Strata, by H. M. Haddock, 817
Mining Industry, by G. Moreau, 419
Motor Boats, Model, by E. W. Hobbs, 752
Motor Car, Ford, A Model, Construction, Operation and Repair, by V. W. Page, 442
Model Power Boats, by E. W. Hobbs, 752
Motor Ship Reference Book, 1930, 105
Motor Show, Milan, Report, 829
Motor Vehicles, Lighting Generators and Batteries, by A. Mattes and Dr. F. Trautmann, 440
Motor Vehicles and Tractors, by P. M. Heldt, 16
Motorships of the World and Motorshipping Register, Edited by A. C. Hardy, 264

NATIONAL Physical Laboratory Report, 814
Natural Tables, Seven-Place, by H. C. Ives, 505
Naval Engineers, Biography of W. Stoddart, by L. Hanbridge, 784
Naval Reference Book, Jane's Fighting Ships, 10
Naval and Shipping Annual, Brassey's, 1930, Edited by Comdr. C. N. Robinson, 500
Non-Ferrous Metals, Properties of, Textbook, by Prof. F. Sauerwald, 75
Note sur les Connaissances Actuelles des Propriétés de la Vapeur d'Eau, by M. D. Sochaczewer, 264

OIL Wells, Gas Air-Lift Pocket Book, by R. Stirling, 75
Ore and Coal Dressing, by A. E. Liwehr, 192
Overhead Power Lines, by W. Morecombe, 440

PAPER Makers, Directory of, 829
Petroleum Wells, Gas Air-Lift Pocket Book, by R. Stirling, 752
Photographic Almanac, British Journal, 346
Pioneers of Electrical Communication, by R. Appleyard, 817
Pittsburgh, Bridges of, by J. White and M. W. Bernewitz, 419
Pocket Book Colliery Managers', 43
Pocket Book, Electrical, "Practical Engineer," 10
Pocket Book, Gas Air-Lift, by R. Stirling, 752
Pocket Book, General Engineering Calculations, by Ing. B. M. Kororski, 784

Pocket Book, Mechanical, "Practical Engineer," 10
Pocket Books and Diaries, 10, 43, 105
Pocket Diary, Architects' and Surveyors', 105
Ports, Great Western Railway, 594
Port of London, Peepshow of, by A. G. Linney, 440
Power Plants, the Modern Boiler House, by H. S. Webster, 419
Power Plants, Water, by Dr. Ing. F. Bundscher, 550
Power Transmission, Belt-Fastener Tests, 541
Power Transmission by Belting, 541
Power Transmission, Overhead Lines, by W. Morecombe, 440
"Practical Engineer" Electrical Pocket Book and Diary, 10
"Practical Engineer" Mechanical Pocket Book and Diary, 10
Prospecting, Geophysical, Depth Attainable by Electrical Methods, by A. S. Eve, Dr. D. A. Keys and F. W. Lee, 752
Prospecting for Minerals, Geophysical Methods, by A. S. Eve and Dr. D. A. Keys, 39

RADIO Communication. See *Telephony; Telegraphy*
Railway, Great Western, Ports, 504
Railways, Italian, Royal Train, 573
Railway, Liverpool and Manchester, Centenary History, by C. F. Dendy Marshall, 130
Railway Work, Heat Economy in, by Dr.-Ing. F. Landsberg, 505
Railway Year Book, 798
Refrigeration, Cold Storage Diary, 43
Reinforced Concrete. See *Ferro-Concrete*
Report, Annual, Institution of Chemical Engineers, 556
Report, Milan Motor Show, 829
Report, National Physical Laboratory, 814
Report of National Screw Thread Commission, Bureau of Standards, 505
Rock Drills, Steel, Treatment of, 364
Rockets for Space Navigation, by H. Oberth, 275
Rolls, Chilled-Iron, Manufacture of, by A. Allison, 274
Roof Supports, Anthracite Mines, Pennsylvania, Tests of Strength, 550
Rules, Regulations and Specifications Affecting Supply and Distribution of Electricity, 505

SCHELDT, River, Effect of Tides on Ground Water in Special Formations of Clay and Peat, by J. H. Steggewentz, 784
Science, Building, Experimental, by Manson & Drury, 505
Scientific and Learned Societies of Great Britain and Ireland, Year Book, 440
Scientists' Reference Book and Diary, 43
Scotland, Journal of Tour in 1819, by R. Southey, 501
Screw-Thread Commission, National, Report, United States Bureau of Standards, 505.
Screw-Thread Tolerances, German, by Prof. Dr. G. Berndt, 562
Shafts, Strength in Vibration, by Capt. J. Morris, 440
Ships, Motor, and Motor Shipping Register, Edited by A. C. Hardy, 264
Ships, Motor, Reference Book, 1930, 105
Shipowners, Shipbuilders and Marine Engineers, Directory, 541
Shippers, Merchants and Manufacturers of the World, Kelly's Directory, 784
Shipping and Naval Annual, Brassey's, 1930, Edited by Comdr. C. N. Robinson, 500
Societies, Scientific and Learned, of Great Britain and Ireland, Year Book, 440
South American Handbook, 1930, 147
South and East Africa Year Book and Guide, 147
Southey's Journal of a Tour in Scotland in 1819, 501
Specifications, British, Standard Index, 330
Square Roots, Standard Tables of, by Prof. L. M. Milne-Thomson, 550
Stairbuilding and Handrailing, by J. S. Dowsett, 505
Standards, Complete Tentative and Supplementary, American Society for Testing Materials, 550
Standard Railway-Signalling Symbols, 734
Standard Specifications, British, Index, 330
Standards, United States Bureau of, National Screw-Thread Commission Report, 505
Starkstromtechnik, by Rziha and Seidener, 752
Statically-Indeterminate Systems, Calculations for, Vol. I, Simple Frames, by Prof. J. Reiger, 131
Steam, Properties of, Existing Knowledge, by M. D. Sochaczewer, 264
Steam Turbines. See *Turbines*
Steel Construction, American Institute, Code, 752
Steel and Iron Handbook, Eisenhütte, 419
Steel and Iron Trades, 1929, 168
Steel Structures, Simple, Practical Design of, Vol. I. Shop Practice, Riveted Connections and Beams, &c.; Vol. II. Plate Girders, Columns, Trusses, &c.; Vol. III. Tables, by D. S. Stewart, 676
Steel, Structural, Facts about Industry, American Institute of Steel Construction, 752
Steel and Timber, Elementary Structural Problems, by C. R. Young, 452
Stoddart, W., Biographical Sketch, by L. Hanbidge, 784
Stodola, Dr. A., Seventieth Birthday Memorial, 38
Storage-Battery Locomotives for Mines, 696
Storekeeping, Accounting and Perpetual Inventory, by C. H. Smith, 751
Stove Plates, Iron, Artistic, by Dr. A. Kippenberger, 192
Strata, Disrupted, by M. H. Haddock, 817
Strength of Materials, by J. O. Draffin, 163
Structures, Statically-Indeterminate, Calculations for, Vol. I. Simple Frames, by Prof. J. Reiger, 131
Structures, Steel, Simple, Practical Design of, Vol. I, Shop Practice, Riveted Connections and Beams, &c.; Vol. II, Plate Girders, Columns, Trusses, &c.; Vol. III, Tables, by D. S. Stewart, 676
Structural Problems, Elementary, in Steel and Timber, by C. R. Young, 452
Structural Steel Industry, Facts About, American Institute of Steel Construction, 752
Surveying, Seven-Place Natural Tables, by H. C. Ives, 505
Surveyors' and Architects' Pocket Diary, 105

TABLES, Annual, "Electrician," Electricity Supply Undertakings, 784
Tables, Five-Figure, Cambridge, by F. G. Hall and E. K. Rideal, 440
Tables, Natural Seven-Place, by H. C. Ives, 505
Tables, Standard, of Square Roots, by Prof. L. M. Milne-Thomson, 550
Telegraphy, Pioneers of Electrical Communication, by R. Appleyard, 817
Telegraphy and Telephony, Including Wireless Communication, by Dr. E. Mallett, 275
Telegraphy, Wireless, Elements of, by J. H. Morecroft, 191
Telephony and Telegraphy, Including Wireless Communication, by Dr. E. Mallett, 275
Telephony, Wireless, Elements of, by J. H. Morecroft, 191
Telford, Work of, Southey's Journal of a Tour in Scotland in 1819, 501
Testing Materials, American Society for, Complete Tentative and Supplementary Standards, 550
Thermodynamics, Theory of Heat Engines, by Prof. A. Loschge, 806
Tides, River Scheldt, Effect on Ground Water in Special Formations of Clay and Peat, by J. H. Steggewents, 784
Timber and Steel, Elementary Structural Problems, by C. R. Young, 452
Time Table, Aerial A.B.C. 63
Tin Statistics, 477
Tokyo, World Engineering Congress, Publication of Proceedings, 828
Tolerances, Screw-Thread, German, by Prof. Dr. G. Berndt, 562
Tractors and Vehicles, Motor, by P. M. Heldt, 162
Trade, Commercial Annual Review, 234
Train, Royal, Italian, 573
Turbines, Steam, Work of Dr. A. Stodola, 38

UNITED STATES Bureau of Mines, Tests of Strength of Roof Supports in Anthracite Mines, 550; Electric Locomotives for Mines, 696
United States Bureau of Standards, Report of National Screw Thread Commission, 505
University College, London, 1826–1926, by H. H. Bellot, 98

VANCORAM Review, Organ of the Vanadium Corporation of America, 45
Ventilation of Mines (Generation of the Air Current), by Prof. H. Briggs, 264
Vibration and the Strength of Shafts, by Capt. J. Morris, 440
Vorlesungen über Maschinenelemente, Heft IV, by Prof. ten Bosch, 550

WÄRMEKRAFT und Wärmearbeits-Maschinen, by Prof. A. Loschge, 806
Wärmewirtschaft in Eisenbahnwesen, by Dr.-Ing. F. Landsberg, 505
Warships, Brassey's Naval and Shipping Annual, Edited by Comdr. C. N. Robinson, 500
Warships, Jane's Fighting Ships, 10
Warships, Naval Engineers, Biography of W. Stoddart, by L. Hanbridge, 784
Wasserkraftanlagen, by Dr.-Ing. F. Bundscher, 550
Water Engineering, Constructional Problems of Applied Hydraulics, by Dr.-Ing. O. Streck, 817
Water Power Plants, by Dr.-Ing. F. Bundscher, 550
Water-Tube Boilers, Calculations and Behaviour, by F. Münzinger, 100
Wege zur Raumschiffahrt, by H. Oberth, 275
Welding, Arc, Lincoln Prize Papers, American Society of Mechanical Engineers, Edited by E. P. Hulse, 452
Wellington Harbour, New Zealand, Year Book, 779
Wells, Oil, Gas Air-Lift Pocket Book, by R. Stirling, 752
Who's Who, 1930, 147
Wireless Telegraphy. See *Telegraphy*
Wireless Telephony. See *Telephony*
Wonders of Engineering, by E. Hawks, 264
World Engineering Congress, Tokyo, Publication of Proceedings, 828

YEAR BOOK, 1929, Adlershof Experimental Station for Aerial Navigation, Edited by Dr.-Ing. W. Hoff, O. v. Dewitz, and Dr.-Ing. G. Madelung, 100
Year Books and Annuals, 10, 43, 105, 147, 234
Year Book, Concrete, 234
Year Book and Directory, Colliery, 799
Year Book, Electrical Contractors', 43
Year Book and Guide, South and East Africa, 147
Year Book, "Mechanical World," 234
Year Book, Mercantile, 683
Year Book, Railway, 798
Year Book of Scientific and Learned Societies of Great Britain and Ireland, 440
Year Book, Wellington Harbour, New Zealand, 779

PARAGRAPHS.

Accidents :
Safety First Congress, 637
United States, Causes of Accidents and Frequency Rate, 11

Aeronautics :
Aerial Time Table, A.B.C., 63
Aeroplanes (Catalogue), 813
Aluminium in Construction Work (Catalogue), 784
Apprentices, Aircraft, Vacancies, 148
Australia, Civil Aviation Statistics, 479
Australian Air Services 412
Brussels-Cologne Night Mail Service, 411
Canada, Aerial Surveying in, 290
Congo, Aerial Surveying in, 167
Czecho-Roumanian Air Service, Proposed, 108
Czechoslovakia, Ford Aeroplane for, 102
Fisheries, Use of Aircraft, 385
Hispano-Suiza, French, Technical Bulletin, 784
Java, Air Services, 448
Lloyd's Register Aviation Committee, 108
Manchuria-Japan Service, 201
Marseilles-Tunis Air Service, 255
R 38 Memorial Prize, 372
Swedish Ambulance Aeroplane, 159
Townend Ring, Commercial Rights, 703

Agriculture :
Canadian Agricultural Implements, 24
Fertilisers, Artificial, Synthetic-Ammonia Plant, Waldenberg, 505
Trade Opportunities, Overseas, 47, 79, 418

Alloys :
See *Mining and Metallurgy*

Appointments, Awards, and Honours :
Architecture, Royal Gold Medal, to Dr. Worthington, 255, 280
Bessemer Gold Medals, 295
China, Commercial Diplomatic Service Appointments, 268

Appointments, Awards and Honours— *continued.*
Faraday Medal, Sir E. Rutherford, 139
Iron and Steel, National Federation, Appointments, 836
Scientific and Industrial Research, Advisory Council, 644

Automobiles :
See *Motor Cars*

Boilers :
See *Engines and Boilers*

Bridges :
India, Lower Sone Bridge, Re-Girdering, *Erratum*, 697
Manchester Canal Bridges and Heavy Road Traffic, 411

Buildings and Building Construction :
Air Heaters (Catalogue), 396
Architects' Drawings Exhibition, 589
Protection of Buildings (Der Bautenschutz) 556

Canals :
Manchester Ship, 1929 Statistics, 486

Catalogues :
61, 93, 148, 239, 270, 301, 332, 396, 429, 462, 494, 524, 557, 590, 620, 654, 687, 720, 784, 813
Accles & Pollock, Ltd., 494
Adamson, Joseph, & Co., 462
A.E.G. Electric Co., Ltd., 332
Allen, Edgar, & Co., Ltd., 494, 720
Allgemeine Electricitäts Gesellschaft, 148, 590
Allis-Chalmers Manufacturing Co., 720
Alloy Welding Processes, Ltd., 61, 557, 654, 813
American Laundry Machinery Co., Ltd., 654

Catalogues— *continued.*
Ashmore, Benson, Pease & Co., Ltd., 687, 744 (*Erratum*)
Associated Equipment Co., Ltd., 93, 620, 784
Ateliers de Constructions Electriques de Charleroi, 557
Ateliers de Constructions Mécaniques, 301
Atlas Diesel Co., Ltd., 61, 462, 784
Bakelite, Ltd., 687
Bamag-Meguin (G.B.), Ltd., 301
B.E.N. Patents, Ltd., 301
Beardmore, Wm., & Co., Ltd., 687
Beardsall, W. E., & Co., Ltd., 720
Beck & Co., Ltd., 270
Beck, O. N., 332, 429
Benjamin Electric, Ltd., 396, 429
Bennis, Edward, & Co., Ltd., 301
Berliner Maschinenbau A.G., 590
Birtley Iron Co., Ltd., 429
Blackman Export Co., Ltd., 590
Blackstone & Co., Ltd., 590
Blagg & Johnson, Ltd., 61
Boby, Robert, Ltd., 494, 687
Brill, J. G., Co., 524
British Aluminium Co., Ltd., 462, 784
British Automatic Regulators, 429
British Brown-Boveri, Ltd., 524, 620
British Commercial Gas Association, 462, 813
British Insulated Cables, Ltd., 270 429, 494, 784
British Mannesmann Tube Co., Ltd., 239
British Steam Specialities, Ltd., 720
British Thomson-Houston Co., Ltd., 332, 524, 687 (2)
British Trane Co., 396, 494
Brook Motors, Ltd., 462
Brookhirst Switchgear, Ltd., 301, 429, 620, 687, 784
Brotherhood, Peter, Ltd., 239
Brown, Boveri & Co., Ltd., 148, 301
Brown Brothers, Ltd., 620
Brown, David, & Sons (Huddersfield), Ltd., 494
Budenberg Gauge Co., Ltd., 654
Bull Motors, Ltd., 654
Cambridge Instrument Co., Ltd., 93, 270, 784

Catalogues— *continued.*
Cantie Switch Co., Ltd., 148, 396
Carrier-Ross Engineering Co., Ltd., 494
Celite Products Corporation and Johns-Manville Corporation, 813
Cement Marketing Co., Ltd., 93, 620
Clean Coal Co., Ltd., 270
Cockburn, A., & Co., 590
Cohen, George, Sons & Co., Ltd., 654
Collis & Sons, Ltd., 687
Consolidated Pneumatic Tool Co., (South Africa Proprietary), Ltd., 720
Constructional Engineering Co., Ltd., 239
Corma & Sava Pump Co., 61
Coventry Chain Co., Ltd., 494
Coventry Victor Motor Co., Ltd., 93
Crockatt, W., & Sons, Ltd., 148
Crompton-Parkinson, Ltd., 654, 720
Dampney, J., & Co., Ltd., 270
Daniell, S. A., Ltd., 462
Danks, H. & T., 270
Davenport Engineering Co., Ltd., 784
De Bothezat Impeller Co., Inc., 462, 654
Demag Co., 301
Dieny, Paul, 61
Dikkers, G., & Co., (England), Ltd., 654
Dobbie, McInnes & Clyde, Ltd., 301
Donovan & Co., 270
D.P. Battery Co., Ltd., 590
Drayton Regulator and Instrument Co., Ltd., 524
Dressing and Screening Co., Ltd., 557
Duckham, Alex., & Co., Ltd., 93
Edwards, F. G., Ltd., 61
Electric Resistance Furnace Co., Ltd., 784
Ellmar Mouldings Co., 720
English Electric Co., Ltd., 332, 462, 494, 720
English Steel Corporation, Ltd., 332, 620
Escher, Wyss & Co., 148, 301, 620
Evertite Lockuts, Ltd., 61
Fairbairn, Ernest, Ltd., 301
Feedwater Specialists, Ltd., 61
Ferranti, Ltd., 61, 524
Fluidmeters, Ltd., 301
Foster-Wheeler Corporation, 61
Fry's (London), Ltd., 396
Gas Light & Coke Co., 590

Catalogues—*continued.*

Gasified Pulverised Fuel (G.P.F.), Ltd., 462
General Electric Co., Ltd., 270, 301, 654, 720
Gent & Co., Ltd., 270
Glenboig Union Fireclay Co., Ltd., 61
Goodall, Clayton & Co., Ltd., 620
Graham, Alfred, & Co., Ltd., 494
Greenwood & Batley, Ltd., 590
Gummers, Ltd., 590
Hadfields, Ltd., 301, 784
Haggerty, Lawrance & Co., 720
Hamworthy Engineering Co., Ltd., 813
Hathorn, Davey & Co., Ltd., 396
Henderson, John M., & Co., Ltd., 429
Henley's, W. T., Telegraph Works Co., Ltd., 813
Herbert, Alfred, Ltd., 590
Herbert, Edward G., Ltd., 494, 720
Hick, Hargreaves & Co., Ltd., 429
Hill, Rowland, & Sons, Ltd., 462
Hispano-Suiza Co. (French), 784
Holland, Bernard, & Co., 524, 654
Hopkinsons, Ltd., 270
Igranic Electric Co., Ltd., 93, 720
Integra Co., Ltd., 462
Ironite Co., Ltd., 462
Ismailia Valve Co., 462
Jenkins, R., & Co., Ltd., 813 (2)
Jones & Lamson Machine Co., 429, 462
Keighley Gear Cutting Co., 813
Kenyon, William, & Son., Ltd., 720
Kirkup, R. H., & Co., 557
Korting & Mathiesen Electrical, Ltd., 524, 557, 813
Kraberhall, Inc., 462, 720
Krupp, Fried., 61
Lawson Manufacturing Co. (1926), Ltd., 813
Laycock Engineering Co., Ltd., 720
Le Boutillier, Ltd., John, 687
Lea Recorder Co., Ltd., 148
Lentz Patents, Ltd., 654
Libraco, Ltd., 301
Light Radiators, Ltd., 813
Lindsay, Henry, 494
Liverpool Borax Co., Ltd., 524
London Electric Firm, 61, 148
Lunken Co., Ltd., 301
Macinlop, Ltd., 813
Marryat & Place, 301
Marshall, Sons & Co., Ltd., 494
Mavor & Coulson, Ltd., 332, 654, 784
Memphis Engineering Repair Co., 404
Merryweather & Sons, Ltd., 239
Metropolitan-Vickers Electrical Co., Ltd., 239, 396, 429, 590, 720
Milne, James, Cooper & Co., Ltd., 270
Moss Gear Co., Ltd., 93
Mosses & Mitchell, Ltd., 93
National Safety Services, Ltd., 301
New Distributors of Edison Storage Batteries, Ltd., 557
Newton, Chambers & Co., Ltd., 524
Norrie, L. F., & Co., 93
Nydqvist & Holm, A.-B., 620
Oerlikon Co., 93, 462
Osborne, Samuel, & Co., Ltd., 784
Owens Boiler Circulator, Ltd., 494
Parsons, C. A., & Co., Ltd., 270
Parsons Oil Engine Co., 148
Peebles, Bruce, & Co., Ltd., 813
Pels, Henry, & Co., Ltd., 813
Perfecta Seamless Steel Tube & Conduit Co. (1923), Ltd., 61
Perry, F. A., 590
Petters, Ltd., 429, 784
Philips, 654
Power House Components, Ltd., 301, 813
Rateau Co., 93, 270, 620
Rennie Tool Co,, Ltd., 429
Reyrolle, A., & Co., Ltd., 524
Richardsons, Westgarth & Co., Ltd., 494
Robinson, Thos., & Son, Ltd., 61
Ruston & Hornsby, Ltd., 557
Ryder, Thomas, & Son, Ltd., 813
Sankey, J. H., & Son, Ltd., 61, 784
Sentinel Waggon Works, Ltd., 301, 687
Shannon, Ltd., The, 524
Siemens Brothers & Co., Ltd., 429, 462, 494, 813
Siemens-Schuckertwerke, A.G., 590
Sisson, W., & Co., Ltd., 557
Skefko Ball Bearing Co., Ltd., 301, 396
Skoda Co., 61, 462, 524, 590
Smith & Davis, Ltd., 590
Société Alsacienne C.M., 590
Sperry Gyroscope Co., Ltd., 524
Statter, J. & G., & Co., 557
Stein & Atkinson, Ltd., 239
Sternol, Ltd., 93
Stewart & Lloyds, Ltd., 270, 557
Sturtevant Engineering Co., Ltd., 396, 524
Submarine Signal Corporation, 148
Sulzer Brothers, 429, 494
Superheater Co., Ltd., 396, 524, 654
Switchgear & Cowans, Ltd., 654
Tangent Tool Engineering Co., Ltd., 784
Tangyes, Ltd., 524, 720
Tractor Traders, Ltd., 396
Trost Brothers, 813
Tungstone Accumulator Co., Ltd., 301
Underfeed Stoker Co., Ltd., 687
United Dry Docks, Inc., 784
United Machine Tool Co., Ltd., 93, 494
Universal System of Machine Moulding and Machinery Co., Ltd., 654
Vacuum Oil Co., Ltd., 396
Veeder-Root, Inc., 396
Veritys, Ltd., 239
Vickers, Ltd., 590
Vickers-Armstrongs, Ltd., 590
Wagner Electric Corporation, 270
Wallsend Slipway & Engineering Co., Ltd., 61
Wanderer-Werke, A.G., 396
Warner & Co., Ltd., 270
Warren Brothers (Middlesbrough), Ltd., 396
Watson & Sons (Electro-Medical), Ltd., 494, 654
Weir, G. & J., Ltd., 784
Wentworth, Darcy, 813
Westinghouse Brake & Saxby Signal Co., Ltd., 654
Westinghouse Electric & Manufacturing Co., 61, 239, 301, 590

Catalogues—*continued.*

Wigglesworth, Frank, & Co., Ltd., 620
Wild-Barfield Electric Furnaces, Ltd., 148
Wingrove & Rogers, Ltd., 93
Wiseman, Alfred, Ltd., 462, 524
Woodall-Duckham Vertical Retort & Oven Construction Co. (1920), Ltd., 462
Workington Iron & Steel, Branch of the United Steel Companies, Ltd., 720
Young Accumulator Co. (1929), Ltd., 301

Cement and Concrete :

Cement, Snowcrete (Catalogues), 93, 620
Liége International Congress, 836
Reservoir, Reinforced-Concrete, Elevated, at Sydney, 137

Chemistry :

See *Physics and Chemistry.*

Coal :

Australian Reserves, 509
Canadian Imports, 767
Cardiff, 14, 47, 79, 109, 138, 171, 201, 254, 285, 316,, 347, 379, 411, 444, 479, 509, 541, 573, 605, 637, 671, 703, 735, 767, 799, 829
Coal-Cleaning Plant (Catalogues), 270, 429, 557
Coal Owners' Association, Chairmanship, 379
Coal Production and Shipment, Brochure, 88
Colliery Equipment (Catalogue), 654
Colliery Guide and Directory, North of England, 779
Colliery Year-Book and Directory, 799
Combines, Mr. Merrett on Advantages, 79
Contract, 500,000-ton, Buenos Ayres Electricity Works, 829
Conveyors, Colliery (Catalogue), 332
Egyptian Railway Coal Contract, 541, 573
Hull Trade, 379
Middlesbrough Coke, 14, 46, 78, 109, 138, 170, 200, 255, 284, 316, 346, 378, 410, 445, 508, 540, 572, 604, 636, 670, 702, 735, 766, 798, 828
Mining Plant (Catalogue), 620
Morocco, Coal Outcrop, 15
National Coal Reserves, Survey of, 663
Pulverised-Coal Firing (Catalogue), 301
Sheffield, 15, 46, 79, 109, 139, 170, 201, 255, 285, 317, 347, 379, 411, 444, 479, 509, 541, 572, 605, 637, 671, 703, 735, 767, 799, 829
South Metropolitan Electric Light & Power Co., 688
South Wales Coal Trimmers and Night Work, 541, 605
United States, Trolley Wires in Mines, Regulations, 380
Welsh Trade Results, 316, 735

Colleges :

See *Education*

Companies :

Hills Dry Dock & Engineering Co., Ltd. (in Liq.), 605
Pyrene Co., Ltd., 703

Concrete :

See *Cement and Concrete*

Cranes, Conveyors, &c. :

Conveyors, Roller (Catalogue), 654
Conveyors, Schenck-Heymann (Catalogue), 687
Handling Plant (Catalogue), 301
Hetch-Hetchy Water Supply Scheme, Cableway, *Addendum*, 252
Lifts (Catalogue), 301
Trucks, Lifting (Catalogue), 687
United States, Aluminium Crane, 541

Docks :

See *Harbours, Docks, etc.*

Education :

Faraday House Entrance Scholarships, 568
Morris, John, Memorial Prize, 170
Sorbonne, Summer Courses in French, 318
Students, National Union, Work of, 411
Women Engineers, Facilities for Training, 504

Electricity :

Accumulators (Catalogues), 301 (2), 557, 590
Aircraft, Wireless Equipment for (Catalogue), 494
Alternators for Hydraulic Turbines (Catalogue), 332
Apparatus, Electrical (Catalogues), 239, 429
Australia, Wiring Rules, Electrical, 507
British Columbia, Hydro-Electric Power Developments, 829
Cable, Electric, Interlocking-Tile Covers, 317
Cable-Laying (Catalogue), 590
Cables, Lead-Sheathed, Bonding (Catalogue), 813
Cable Wheel, Self-Winding, and Lamp (Catalogue), 301
Calcutta, Hooghly River Cable Tunnel, 124
Canada, Electrolytic Hydrogen Plant, 109
Channel Islands and Mainland, Public Telephone Service, 393
Chimneys, Power Station, Soot, &c., Emission Question, 829
Circuit Breakers (Catalogue), 557
Circuit Breakers, Standard, 54
Conductors, Aluminium, Standard, 445
Conductors, Copper, Standard, 671
Conduit Tubes (Catalogue), 61
Controls (Catalogues), 301, 429
Control Gear, Motor (Catalogues), 620, 784
Converters, Rotary (Catalogue), 332
Earthing Rods (Catalogue), 784
Egypt, Market for Accumulators and Batteries, 483
Equipment, Electrical (Catalogues), 148, 239, 524.
Feeder Pillars (Catalogue), 813

Electricity—*continued.*

Furnaces, Electric (Catalogues), 148, 784
Fittings, Electrical (Catalogue), 270
Generators, Diesel-Electric, Large Peak Load, 411
Greece, Wireless Equipment, 487
Hydro-Electric Plant (Catalogue), 301
Instruments for Ships (Catalogue), 494
Ireland, Electricity Supply in, *Erratum*, 767
Isolating Links (Catalogue), 270
Lamps, Electric (Catalogue), 654
Lamp-Hoisting Gear (Catalogue), 148
Lamp and Self-Winding Cable Wheel (Catalogue), 301
Light Fittings (Catalogues), 396, 557, 720, 813
Light Signs (Catalogue), 813
Lighting, Electric (Catalogues), 301, 524, 654
Load-Despatching System, London Power Co., *Addenda*, 195, 264
Locomotives, Storage-Battery, for Mines, 696
Machinery, General (Catalogues), 61, 93, 148, 239 (2), 332, 429, 524, 557, 590 (2), 620, 654
Marine Electrical Machines (Catalogue), 813
Medical Apparatus, (Catalogue), 654
Meters, Electricity, Standard, 813
Montreal City, Hydro-Electric Power Scheme, 678
Motors, Brushless Single-Phase, *Erratum*, 567
Motors, Electric (Catalogues), 270, 301, 524, 654, 720 (3)
Motors, Synchronous (Catalogue), 301
Nigeria, Water-Power Plant, 24
Plant, Electrical (Catalogue), 590
Plugs and Sockets, Standard, 752
Power-Factor Compensator (Catalogue), 494
Power Station Chimneys, Soot, &c., Emission Question, 829
Power Transmission, Central Scotland (Catalogue), 494
Quebec, Southern, Hydro-Electric Scheme, 147
Research, Electrical (Catalogue), 720
Röntgen-Ray Apparatus (Catalogue), 494
Sockets and Plugs, Standard, 752
South Wales and the Electrical Industry, 79
South-West England and South Wales Scheme, 759
Spain, Electricity Supply, 318
Starter, Air-Break, Three-Phase Motors, *Erratum*, 46
Starters, Motor (Catalogues), 93, 720
Substation Equipment (Catalogue), 301
Switches, Motor (Catalogues), 396
Switches, Standard, 54, 799
Switchgear, (Catalogues), 148, 301, 524, 654 (2), 687 (3), 720, 784
Switchgear, Standard, 321
Switzerland, Broadcasting in, 385
Temperature Measurement, Electric (Catalogue), 429
Testing Apparatus (Catalogue), 61
Turbo-Generators (Catalogue), 270
Vehicles, Electric (Catalogues), 93
Welding, Electric (Catalogues), 61, 720, 813
Wire, Copper, for Electrical Machinery, Standard, 57
Wire, Steel-Cored Copper (Catalogue), 270
Wireless Valves, Seamless Tubing, 299
Workshop Lighting (Catalogue), 429
X-Rays. See *Röntgen* (above)

Engines and Boilers :

Boiler Auxiliaries (Catalogue), 784
Boiler Circulator (Catalogue), 494
Boiler Installation, 600-lb. per sq. in. Pressure, *Erratum*, 509
Boilers, Water-Tube (Catalogue), 270
Cooling Towers (Catalogue), 784
Economisers (Catalogue), 813
Engines, Steam (Catalogue), 557
Feed-Water, Boiler (Catalogues), 61, 524
Gauges, Pressure and Vacuum (Catalogue), 654
Heat Insulation and Packing (Catalogue), 813,
Joints, Expansion (Catalogue), 332
Mountings, Boiler (Catalogue), 590
Salinometer, Electrical (Catalogue), 148
Separators, Steam (Catalogue), 396
Steam Plant (Catalogue), 61
Superheaters (Catalogues), 396, 524
Tubes, Expansion (Catalogue), 301
Turbines, Steam (Catalogues), 148, 239, 429, 494, 590, 687
Turbine, Steam, 500-kw. Impulse, *Erratum* 798
United States, Record Boiler Performance, 137
Valves (Catalogues), 93, 270 (2), 590 (2), 654, 720, 813
Valves, Blow-Down (Catalogue), 429
Valves, Safety (Catalogue), 93

Errata and Addenda :

Air-Break Starter for Three-Phase Motors, 46
Ashmore, Benson, Pease & Co., Ltd., 744
Boiler Installation, 600-lb. per sq. in., Design and Results, 509
Brown, David, & Sons (Hudd.), Ltd., 744
Cableways, Construction, Hetch Hetchy Water Supply, 252
Canadian Budget, 683
Copper, De-Oxidation, by Phosphorus, 436
Dams, Curved, Safety of, World Power Conference, 411
Hydraulic Press, Flexible-Platen, 703
Ireland, Electricity Supply, in, 767
Lathe, V.D.F. Standard, 408
Load-Despatching System of the London Power Co., 195, 264
Locomotive, Electric, 7,200-h.p., Swiss Federal Railways, 637
Locomotive, High-Pressure, 4-6-2-2 Type, London and North Eastern Railway, 47
Motors, Brushless Single-Phase, 567
Lower Sone Bridge, Re-Girdering, 697
Roll-Grinding Machine, Precision, 640
Scaling Tools, Rotary, Electrically-Operated, 79
Thread Rolling, 766
Turbine, Steam, 500-kw. Impulse, 798
Walsh Island Dockyard, Floating Dock for, 410

Exhibitions :

Architects' Drawings, 588
Athens, Hygiene, 439
British Empire Trade, Buenos Aires, 71, 509
British Industries Fair, Development Committee, 605
Exhibitions Chart, 170
Geneva Motor & Cycle Show, Report, 637
Inventions, International, 703
Leipzig Fair and the Danish Government, 86
Liége Exhibition, Aluminium Pavilion, 829
Milan, Cycle and Motor Cycle, 508
Milan, Motor Show, 829
Motor Cycle Show, 284
North East Coast, Sale of Exhibition Buildings, 201
Portugal, Producer-Gas Plant, 25
Swedish Industries Fair, Gothenburg, 509
United States, Import Trade Exhibition, 636
United States Motor Car, 312
Zagreb Fair, Jugo-Slavia, 637

Explosions :

See *Accidents*

Explosives :

See *Guns and Explosives*

Ferro-Concrete :

See *Cement and Concrete*

Flying Machines :

See *Aeronautics*

Gas :

Gas Companies' Accounts, "Gas World" Analysis, 172
Gas Light & Coke Company's Record, 590
Gas Lighting (Catalogue), 813
Heater, Gas (Catalogue), 813
Holders, Gas (Catalogue), 524

Gas and Oil Engines :

Engines, Gas (Catalogue), 687
Engines, Oil, Atomic Diesel (Catalogue), 429
Engines, Oil, General (Catalogues), 61, 93, 148, 429, 494, 620, 687, 784
Engines, Oil, Marine (Catalogues), 61, 148, 429, 494, 687, 784
Motor, Marine, Six Cylinder, Endurance Test, 56
Temperatures, Gas Engine, 696

Harbours, Docks, etc.

Aberdeen Harbour Contracts, 767
Canada, St. John Harbour Development, 720
Cochin, India, Harbour Developments, 636
Dams, Curved, Safety of World Power Conference, *Erratum*, 411
Dock, Floating, Ganges River, 13
Dock Plant (Catalogue), 784
Haifa, Palestine, New Harbour, 637
Oil Dock, Panama Canal, 637
Southampton Docks Extension Scheme, 573
Strasburg Port Works, 63
Walsh Island Dockyard, Floating Dock for, *Addendum*, 410
Wellington, Harbour, New Zealand, 779

Hydraulic :

Malay States Public Works Department, Hydraulic Branch, 29
Pumps, Centrifugal (Catalogues), 270, 590
Pumps, (Catalogues), 396, 524, 557, 720
Water-Flow Measurement (Catalogue), 148

Industries and Commerce :

Advertising Convention, 799
Australia, Imports and Exports, 428
Australia, Machinery Import Duties, 315
Australia, Shale and Coal-Oil Industry, 488
Australian Commerce, 774
Birmingham City, Handbook, 697
Board of Trade Markings, Brooms and Brushes, 285; Bolts and Nuts, 487; Imported Slates, 520; Draughtsmen's and Artists' Materials, 540; Belting and Refractory Bricks, 629; Imported Motor Vehicles, 671
Board of Trade Offices, North East Coast, 324
British Industries Fair Development Committee, 605
British Trade, Encouragement, 799
China, Commercial Diplomatic Service Appointments, 268
China, German Industrial Delegation Visit, 408
China, Machinery Imports, 776
Colombia, British Commerce with, 78
Colombia, British Markets in, 540
Contracts, 15, 47, 139, 147, 171, 200, 255, 284, 316, 347, 379, 410, 453, 479, 508, 540, 572, 605, 636, 671, 703, 735, 767, 799, 829
Counting Machines (Catalogue), 396
France, Tin-Plate Imports, 25
Hack-Saw Blades, International Prices, 505
India Rubber, World Consumption, 60
Jugo-Slavia, Zagreb Fair, 637
Mercantile Year Book, 683
New Zealand, Exports and Imports, 57
Overseas Trade Opportunities, 29, 41, 47, 78, 79, 408, 411, 418, 483, 487, 493, 540, 573, 671, 697, 715, 814
Patents Committee, B.O.T., 428
Personal, 14, 47, 78, 109, 139, 170, 196, 251, 285, 324, 346, 379, 411, 453, 487, 509, 550, 573, 605, 631, 670, 702, 735, 767, 828
Russia, Paper and Cardboard Output, 256
Tasmania, Paper Manufacture in, 479
Tenders, 14, 46, 78, 108, 138, 170, 200, 254, 284, 316, 346, 378, 410, 444, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828
Tin, Industrial Applications Committee, 79
Tin-Plate Exports, 529
United States, Bromine Production, 784
United States, Carbon-Black Industry, 605
United States, Import Trade Exhibition, 636
Wheat Imports, Subsidised, from France, 799

Institutions :

See *Technical Societies*

Iron and Steel :

Blast-Furnace Suspensions, 636
British Production, 161, 253, 524, 618, 645
Canada, British Iron and Steel Preference, 829
Canada, Sault Ste. Marie, Electro-Metallurgical Plant, 256
Canada, Steel Bar and Billets, Standard, 252
Cast Irons, Sampling and Analysis, 32
Chromiferous-Nickel Iron Ore Deposits, 433
Cleveland, 14, 46, 78, 109, 138, 170, 200, 255, 284, 316, 346, 378, 410, 445, 478, 508, 540, 572, 604, 636, 670, 702, 735, 766, 798, 828
Cold-Rolling Mills (Catalogue), 61
Dowlais Works, Record Output, 799
Drawings, Working, of Castings, 360
East Coast Hematite, 14, 46, 78, 109, 138, 170, 200, 255, 284, 316, 346, 378, 410, 445, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828
German Pig-Iron Output, 79
Hardness Tester (Catalogue), 494
Iron and Steel Trades, 1929, 168
Middlesbrough Foreign Ore, 14, 46, 78, 109, 138, 170, 200, 255, 284, 316, 346, 410, 445, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828
Panama Canal, Iron Ore Shipments Through, 799
Pig Iron (Catalogues), 276, 720
Pig-Iron Production, Curtailment, 572, 734
Pipes, Steel (Catalogue), 239
Poles, Steel (Catalogue), 557
Scotch Shipments, 47, 79, 108, 139, 171, 201, 254, 285, 317, 346, 378, 410, 445, 479, 509, 540, 573, 605, 637, 671, 703, 735, 767, 799, 829
Scotch Steel Contracts, 605
Scotch Trade, 15, 47, 79, 108, 139, 170-71, 201, 254, 285, 316, 346, 378, 410, 445, 479, 509, 540, 573, 605, 637, 671, 703, 735, 766, 799, 829
Sheffield, 15, 46, 79, 109, 139, 170, 200, 255, 284, 317, 347, 379, 411, 444, 479, 509, 541, 572, 604, 637, 671, 703, 735, 767, 799, 829
South Wales Industry, Rationalisation, 47
Steel Selling Organisation, International, 573
Steel, Special (Catalogues), 301, 620, 720
Steel Structures, Canadian Specification, 811
Steels, Tool (Catalogues), 494, 784
Swedish Ore Exports, 117, 347
Swedish Pig Iron, &c., Exports, 748
Swedish Production, 7, 71
Tees Imports, 170, 316, 478, 604, 735
Tees Shipments, 170, 316, 445, 604, 735
Tubular Constructions (Catalogue), 494
United States Ore Output, 201
Welsh Trade, 47, 109, 254, 285, 316, 347, 411, 444, 479, 637, 671, 703, 735, 767, 829

Irrigation :

New South Wales, Riverina Irrigation Scheme, 351

Labour Questions :

See *Trade Societies*

Legal and Legislation:

Patents Committee, Board of Trade, 429
Weaver's Wage Deduction Case, 730

Machine and Other Tools :

Cutting Tools (Catalogue), 429
Dies, Screwing (Catalogue), 590
Drills, Rock, Steel, Treatment of, 364
Hack-Saw Blades, Graduated-Tooth, 518
Lathes (Catalogue), 93, 396, 429
Lathes, Combination Turret, Operator's Handbook, 440
Lathe, V.D.F. Standard, *Erratum*, 408
Machine Tools (Catalogues), 494, 654, 784, 813
Milling Machines (Catalogue), 396
Press, Hydraulic, Flexible-Platen, *Addendum*, 703
Roll-Grinding Machine, Precision, *Erratum*, 640
Sawing Machines (Catalogue), 720
Saws, Band (Catalogue), 61
Scaling Tools, Electrically-Operated, *Erratum*, 79
Shearing Machines (Catalogue), 813
Sheet-Metal Working Machinery (Catalogue), 61
Thread Rolling, *Errata* 766
Tools, General (Catalogue), 396
Tools, Pneumatic (Catalogue), 720

Marine Engineering :

See *Engines and Boilers; Ships and Shipbuilding*

Markets :

Cleveland Iron, 14, 46, 78, 109, 138, 170 200, 255, 284, 316, 346, 378, 410, 445, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828

Mining and Metallurgy :

Aluminium, World Production, 96
Australia, Central, Mineral Wealth of, 479
Australia, New South Wales, Mineral Production, 479
Blast-Furnace Equipment (Catalogue), 687
British Columbia, Minerals and Metals, 300
Canada, Asbestos Output, 139
Canada, Gold Production, 180, 351, 698
Canada, Lead Production, 686
Canada, Mineral Output Value, 148
Canada, Nickel Production, 139
Canada, Ontario, Gold Production, 351, 698
Canada, Platinum Metals Production, 816
China, Tungsten Ore in, 767
China, Yunnan, Mineral Resources, 32
Copper, De-Oxidation by Phosphorus, *Erratum*, 436
Empire Mining and Metallurgical Congress, 13

Mining and Metallurgy—*continued.*

Foundry Equipment (Catalogue), 239
Foundry Equipment, Petters, Ltd., 255
French Mines, Directory of, 773
Furnaces, Industrial (Catalogue), 239
Furnace Lining (Catalogue), 61
Harco Magazine, 275
Hardness Tester (Catalogue), 494
Nickel, World Production, 63
Pyrometers (Catalogue), 270
Pyrometer, "Pyroversum," Improved, 579
Queensland, Silver-Lead Mining Concession, 147
Russia, Mercury-Ore Smelting, 454
South Africa, Scientific Mining Methods, 293
Tin Consumption, World's, 9
Tin Output, World's, 135
Tin Statistics, 477
Uganda Tin Shipments, 43, 298
United States, Aluminium Production, 532
United States, Lead Production, 201
United States, Molybdenum Production, 658
Vanadium and Its Alloys, 45

Miscellaneous :

African Colonies, East, Geological Survey, 307
Aveling & Porter, Ltd., Presentation to Long-Service Men, 411
Belting, Hose, &c. (Catalogue), 270
Birmingham City, Handbook, 697
Blacksmiths' Plant (Catalogue), 590
Bolts and Nuts, Dimension-Reading Device, 454
Brown, David, & Sons (Huddersfield), Ltd., Works of, *Erratum*, 744
Calendars, 326
Canada, Hydrogen Plant, Electrolytic, 109
Canadian Budget, *Erratum*, 683
Canadian National Research Laboratories, 108
China, Road Construction Plant, Market for, 487
Compressors, Air (Catalogues), 524, 620, 654, 813
Contracts, 15, 47, 139, 147, 171, 200, 255, 284, 316, 347, 379, 410, 453, 479, 508, 540, 572, 605, 636, 671, 703, 735, 767, 799, 829
Counting Machines (Catalogue), 396
Crushers, Stone (Catalogue), 784
Danube, Land Reclamation Scheme, 54
Door Fittings (Catalogue), 720
Drawing Board Reflector, 347
Engineering, General (Catalogues), 61, 524, 590 (2)
Engineering Standards Association, British, 54, 57, 63, 71, 321, 330, 445, 509, 671, 734, 752, 799, 813
Fans (Catalogues), 524, 654
Fibre, Vulcanised (Catalogue), 93
Engineering Standards Association, British, Index, 330
Factory Heating (Catalogue), 494 (2)
Fire Escape, Self-Lowering, 347
Fire-Extinguishing Apparatus (Catalogue), 239
Fireclay Products (Catalogue), 61
Fluid Meters (Catalogue), 301
Furniture, Office (Catalogue), 301
Grain Machinery (Catalogue), 494
Gyroscope (Catalogue), 524
Handling Plant (Catalogue), 301
Harco Magazine, 275
Heating, Linfield System (Catalogue), 813
Hygiene, Tropical, Lectures on, 250, 637
Instruments (Catalogue), 93
Laundry Machinery (Catalogue), 654
Letter Files (Catalogue), 524
Lock Nuts (Catalogues), 61, 720
Lubrication and Lubricants (Catalogues), 93, 396
Machinery, General (Catalogue), 620
Malay States Public Works Department, Hydraulic Branch, 29
Microscope, Pocket, Reason Manufacturing Co., 147
Moulded Parts (Catalogue), 720
Nomograph for Surveyors, 315
Nuts and Bolts, Dimension-Reading Device, 454
Oil Pipe Line, Caspian-Moscow, 326
Paints (Catalogues), 270, 784
Paints, Standard, Vandyke-Brown, 509
Paper Makers, Directory of, 829
Paris Highway Works, 45
Personal, 14, 47, 78, 109, 139, 170, 196, 251, 285, 324, 346, 379, 411, 453, 487, 509, 550, 573, 605, 631, 670, 702, 735, 767, 828
Photographic Almanac, British Journal, 346
Piano Player, Portable, 180
Pumps, Lubricating (Catalogues), 61, 590
Reflector, Drawing Board, 347
Refrigerating Plant (Catalogue), 61, 687
Refuse Disposal, 478
Regulators, Automatic (Catalogue), 429
Retort for Australian Shale, 109
Road-Making Plant, Trade Opportunity, 411
Road-Marking Machine (Catalogue), 301
Rust Preventer (Catalogue), 93
Scrapers, Drag-Line (Catalogue) 429
Screens (Catalogues), 301, 557
Searchlights (Catalogue), 61
Separators and Screens (Catalogue), 396
Shale, Australian, Retort for, 109
Sheet-Metal Products (Catalogue), 61
Smoke Abatement Conference, 479
Specifications, Standard, Binders for, 301
Synthetic Ammonia Plant, Lower Silesia, 505
Tachometers (Catalogue), 301
Tar, Road, Standard, 71
Temperature Regulators (Catalogue), 524
Tenders, 14, 46, 78, 108, 138, 170, 200, 254, 284, 316, 346, 378, 410, 444, 478, 508, 540, 572, 604, 636, 670, 702, 734, 766, 798, 828
Thermometers, (Catalogue), 784
Timber Testing, Standard Methods, 63
Tyre for Milk Churns (Catalogue), 813
Vessels, Welded (Catalogue), 813
Water-Level Instruments (Catalogue), 270
Welding (Catalogues), 557, 654, 813
Workshop Lighting (Catalogue), 429
Zeiss Measuring Machine, 285

Motor Cars :

Accessories, Motor-Car (Catalogues), 301, 620
Aluminium in Construction Work (Catalogue), 784
Denmark, Motor Tractor Trials, 697
Gears, Motor-Car (Catalogue), 93
Geneva Show, Report, 637
Mexico, Trade Opportunities in, 41
Milan Cycle and Motor Cycle Show, 508
Milan Motor Show, 829
Motor-Car Chain Drives (Catalogue), 494
Motor-Cycle Show, 284
Motor Vehicles (Catalogues), 93, 620, 784
Omnibuses, Double Deck, Weight Order, 703
Tractors, Caterpillar (Catalogue), 396
Trade Opportunities Overseas, 79, 408, 493 697
Truck, Motor (Catalogue), 784
United States, Motor Car Exhibitions, 312
United States, Motor Vehicle Registrations 613
Wagons, Steam (Catalogue), 301

Naval :

"Active," H.M. Destroyer, 347
"Antelope," H.M. Destroyer, 536
"Arrow," H.M. Destroyer, Trials, 478
"Blanche," H.M. Destroyer, Launch, 744
"Boreas," H.M. Destroyer, Launch, 798
Contracts, Naval Construction, 767
"Diane," French Submarine, Launch, 671
"Folkestone," H.M. Sloop, 250
"Hindustan," R.I.M. Sloop, 702
"Scarborough," H.M. Sloop, Launch, 379
Submarines, "R" Class, Launch of Three 799

Naval :

See also *Aeronautics*

Obituary :

See GENERAL INDEX

Physics and Chemistry :

Chemical Engineering and Chemical Catalogue, 828
Crystal Models, Stereoscopic Photographs, 255
National Physical Laboratory, 1929 Report, 814

Power Plants :

See *Electricity*

Power Transmission :

Bearings, Ball (Catalogues), 396
Bearings, Roller (Catalogues), 301, 396
Belt-Fasteners (Catalogue), 590
Belt Fastener Tests, 541
Belting, &c. (Catalogues) 270, 494
Belting, Power Transmission by, 541
Gears (Catalogues), 494, 524, 687 (2), 813
Rope Drives (Catalogues), 494, 620, 720 (2)

Railways and Locomotives :

Bridge and Tunnel Traffic, 189
Bristol, Temple Meads Station, Great Western Railway, 605
Canada, Peace River and Vancouver Railway Scheme, 255
Canada, Quebec, Saguenay and Chibougamau Railway, 550
Canada, Railway Rolling-Stock Manufacture, 690
Canadian Pacific, Branch Line Programme, 518
Cars, Rail, Electric (Catalogue), 524
Cars, Rail, Steam (Catalogue), 687
China, Railway Activities and Schemes, 613
Dock Charges, Railway, South Wales Opposition, 201
Egyptian Railway Coal Contract, 541, 573
Great Western Railway Goods Wagons, 471
Great Western Railway, South Wales Port Works, 385
Italian Royal Train, 573
Locomotive, Electric, 7,200-h.p., for Swiss Federal Railways, 509; *Erratum*, 637
Locomotives and Equipment, Electric (Catalogue), 396
Locomotive, High-Pressure, 4-6-2-2 Type, London and North Eastern Railway, *Erratum*, 47
Locomotives, Light, Turkish Market, 671
Locomotive, Schmidt (Catalogue), 654
Locomotives, Schwartzkopf (Catalogue), 590
Locomotives, Storage-Battery, for Mines, 696
Rolling-Stock Construction, 1930, 124
Scotch Locomotive Contract, 605
Siamese-Cochin China Railways, 18
Signalling Symbols, Standard, 734
Signals, Railway (Catalogue), 654
South African Railways, Engineering Problems, 316
Station, Temple Meads, Bristol, Great Western Railway, 605
Traffic Receipts, British Railways, 263, 671
Tunnel and Bridge Traffic, 189
Valve Gear, Locomotive (Catalogue), 654
Year Book, Railway, 798

Schools :

See *Education*

Sewage and Drainage :

Danube, Marshy Land Drainage Scheme, 54

Ships and Shipbuilding :

"Anthony," S.S., Trials, 196
British Corporation Register of Ships, 323
"Cadillac," S.S., Replacing Mid-Ship Section, 436
Cardiff's Merchant Fleet, 444
"City of Cambridge," S.S., Bauer-Wach Turbine Installation, 139
Clyde Activities, 47, 108, 171, 201, 254, 317, 346, 445, 573, 605, 703, 735

Ships and Shipbuilding—*continued.*

Directory of Shipowners, Shipbuilders and Marine Engineers, 541
Electrical Equipment for Ships (Catalogue), 239
Engines, Marine, Small (Catalogue), 148
"Hobson's Bay," S.S., Reconditioning, 541
Isherwood System, Construction, 202
Instruments, Electrical, for Ships (Catalogue), 494
Launches and Trial Trips, 24, 78, 138, 170, 234, 263, 326, 387, 419, 487, 517, 540, 582 645, 702, 775, 798, 828
Life-Boat Lifting Hooks, Testing of, 167
Machinery, Marine Auxiliary (Catalogue), 93
Machinery, Marine, 1929 Output, 56, 108, 139
Machines, Marine Electrical (Catalogue), 813
Officers' (Merchant Navy), Federation, 504, 605
Repair Work, Ship (Catalogue), 494
Russia, Withdrawal of Lloyd's Register Surveyors, 372
Safety of Life at Sea, Conference, 156
Scotch Construction Contracts, 47, 171, 317, 735, 799
Scotch Shipbuilding, 47, 108, 171, 201, 254, 317, 346, 445, 573, 605, 703, 735
Scotch Shipbuilding in 1929, 47
Shipbuilding Industry, Depression in First Quarter, 1930, 614
Shipbuilding in 1929, 46, 138, 156
Shipowners, Shipbuilders and Marine Engineers, Directory of, 541
Sounding Apparatus, Marine (Catalogue), 148
South Wales, Lay-Up of Ships, 138, 171, 201, 254
South Wales, Repair Contract Lost, 14
South Wales Shipping Companies' Losses, 411
Stabilograph (Catalogue), 301
Surveyors, Ship, B.O.T. Examinations, 264
Thames Motor Tugs, 178
Vickers-Armstrong's Limited, Turbo-Electric Liners Contract, 139
Wallsend Slipway and Engineering Company, Limited, Record (Catalogue), 61

Societies :

See *Technical* and *Trade*

Strikes :

See *Trade Societies*

Technical Societies, &c. :

Aeronautical Society, Royal, 444
Architects, British, Royal Institute of, 56
Australasian Institute of Mining and Metallurgy, 285
Australia, Institution of Engineers, 254
Automobile Engineers, Institution of, 354
British Association, 567
Centralians, Old, 285
Chemical Engineers, Institution of, 550
Compressed Air Society, British, 550
Concrete and Reinforced Concrete, Liége Congress, 836
Consulting Engineers' Congress, Vienna, 15
Electrical Association, Incorporated Municipal, 572
Electrical Development Association, British, 316
Electrical Engineers, Institution of, 88, 379, 451, 541, 671
Electrical Engineers, Institution of, Scottish Centre, 508
Electrical Engineers, Institution of, South Midland Centre, 670
Electrical Engineers, Institution of, Western Centre, 79, 637
Empire Mining and Metallurgical Congress 13, 285
Engineers-in-Charge, Institution of, 525
Engineers, Institution of, Australia, 254
Engineers and Shipbuilders in Scotland, Institution of, 254, 410
Faraday House Old Students, 171
Finsbury College Old Students' Association, 346
Foundrymen, British, Institute of, 585
Gas Engineers, Institution of, 637
Glass Convention, British, 636
Glass Technology, British and German Societies' Meeting, 670
Gliding Association, British, 201
Illumination Congress, International, 799
Iron and Steel Institute, 274, 295, 454
Locomotive Engineers, Institution of (Birmingham Centre), 279
Marine Engineers, Institute of, 445
Metals, Institute of, 193, 270, 285, 436 (*Erratum*), 637
Mining and Metallurgical Congress, Empire, 13, 285
Mining and Metallurgy, Institution of, 321
Municipal and County Engineers, Institution of, 671
Municipal Electrical Association, Incorporated, 572
National Physical Laboratory, 1929 Report, 814
Naval Architects, Institution of, 171, 250, 419, 800
Naval Constructors, Royal Corps of, 199
North-East Coast Institution of Engineers and Shipbuilders, 410
Patentees, Institute of, 439
Refrigerating Engineers, Australia, Institute of, 230
Royal Institution, 478, 605
"Safety First" Association, National, Congress, 637
Sanitary Institute, Royal, 636
Science and Technology, History of International Congress, 568
Siemens Men, Ex-, Association of, 317
Skilled Employment and Apprenticeship Association, 829
Transport, Institute of, 652, 670, 717
Water Engineers, Institution of, 347, 573
Waterworks Association, British, 767
Whitworth Society, 138

Technical Societies, &c.—*continued.*

Women's Engineering Society, 504
World Engineering Congress, Tokio, 828
World Power Conference, Berlin, 671, 697

Telephony :

See *Electricity*

Tools :

See *Machine and Other Tools*

Trade Societies, &c. :

Accidents, Handling, United States Data, 11
Agricultural Labour, British, Mr. Beard on Present Danger and Its Remedy, 537
Appleton, Mr., on Combinations in Industry, 179; on Disputes, Origin and Continuance, Responsibility, 763; on Rationalisation, 763
Australia, Conciliation Courts, Suggested Modification of Composition, 614
Austrian Federation of Industries on Social Charges, 179
Beard and Citrine, New Year Message to Trade Unionists, 42
Beard, J., on Agricultural Labour, Present Danger and Remedy, 537
Belgium, Arbitration and Conciliation Data, 42, 388
Boilermakers, Society, Mr. Hill on the T.U.C. Scheme for Abating Unemployment by Scrapping Old Ships, 824; Membership, &c., 11, 118, 294, 441, 569, 712, 824; Piece-Workers' Earnings Question, 569
Brazil, Relief Tax for Musicians Displaced by Mechanical Apparatus, 537
Building Trades and the Five-Day Week, 420; Rationalisation, 824
Building Trade Wages Question, 78, 135, 420
Burnley Weavers and the Eight-Loom System, 441
Canada, Steel Company's Scheme for Improved Labour Conditions, 441
Capital and Taxation, Federation of Trades, Report on Enquiry, 488
Cement Industry, Home Office Order for Welfare Arrangements, 322
Christian Trade Unions, International, and Hours of Work, 730
Citrine and Beard, New Year Message to Trade Unionists, 42
Citrine, Mr., on the Association of Manual and Non-Manual Workers, 11; on Conference Machinery for Employers and Employed, 118
Cleveland Blast Furnacemen's Wages, 46, 478
Cleveland Ironstone Miners' Wages, 78, 508
Coal Mining, International Technical Conference on Conditions of Work, Agreed Points, 135
Cokemen and By-Product Workers' Union, Proposed Educational Scheme, 763
Commerce, British Chambers of, and Wages in Sheltered Occupations, 646
Convict Labour in South African Agriculture, Proposed, 197
Cotton Trade Wages Question, 135
Diseases, Occupational, T.U.C. Medical Adviser, 251
Disputes, Origin and Continuance, Responsibility Question, 763
Distributive and Allied Workers' Union, Financial Position, 197
Economics, Industrial, Causes of Instability, 294
Eight Hours Bill and Railwaymen, 420
Electrical Contracting Industry, Wage Reductions, 730
Electrical Trades, Generating and Substation Engineers' Wages, 666
"Electrical Trades Journal," on the Engineering Trades Joint Wages Movement, 388; on Labour-Saving Appliances and Unemployment Benefit, 388; on Unemployment, 646; on the Wage Settlement, 824
Electrical Trade Union, 1929 Progress, 118
Electrical Trade Wages, 78, 251, 518, 666, 730, 824
Electrical Trade Workers, Breach of Union Conditions, 118
Electrical Trade Workers' Prosperous Year, 118
Employers and Employed, Mr. Citrine on Conference Machinery, 118
Employers' Federation, Engineering and Allied, New Chairman, 356
Employment-Exchange Reports, 11, 42, 78, 118, 135, 179, 197, 251, 322, 356, 388, 420, 441, 488, 569, 614, 646, 666, 712, 730, 794, 824
Enfield Small Arms Factory, Government Decision to Abolish Piecework, 388
Engineering Trade Wages Question, 77, 135, 294, 420, 569, 646
Engineering Union, Amalgamated, Annual Report, 537; Mr. Brownlie on Achievement and Hopes, 77; Mr. Brownlie on his Retirement, 794; Election of President, 197, 537; and Employers, Conference on Various Questions Deferred, 356; Government and Proposed Trade Inquiry, 537, 614, 646; Membership and Benefit Data, 77, 118, 197, 356, 518, 537, 569, 646, 794; National Committee's Agenda at Manchester Meeting, 569; on Overtime and Unemployment in the Industry, 518, 569; on Rationalisation and the Skilled Worker, 135; on the Principle of Rationalisation, 646; Rejection of Foreign Industries Inquiry, 420; Revival Fund, 730; Road Traffic Mechanics, 197; York Memorandum, 646

Trade Societies, &c.—*continued.*

Factory Inspectorate, Government, Changes in, 420
Federation of British Industries and the Employers and Workers Provisional Agreement, 77
Federation of Trades, General Committee's Report on Taxation and Prices Inquiry, 488
Federation of Trades, General, Reports, 179, 614, 763
Federation of Trades, International, Membership, &c., 11, 794
France, Foreign Labour Immigration, 614, 730; Labour Agreements in 1928, Statistics, 322; Saar Territory, Inter-Territorial Arrangement for Student Employees, 388; Social Legislation and Its Economic Difficulties, 518
Friendly Societies, Annual Report, 441
Gas Industry, Workers' Compensation for Displacement, 614
Germany, Federation of Employers' Associations, Report, 518; National Economic Council, Proposed Labour Legislation, 197; Metal and Engineering Workers Demands, 824; Metal Workers Terminate Working Hours Agreement, 824; Metal Workers' Wage Reduction, 794; National Federation of Industry, Change in Constitution, 518; Order against Night Work for Boys, 614; Seafarers' New Wages Rates, 294; Social Developments and Economic Possibilities, 518; Stahlwerk Becker's Agreement with Employees Annulled by Metal-Workers' Union, 488; Unemployment Benefit Data, 388, 712, 794; Unemployment Figures, 42, 135, 388, 794; Women Unionist Wages Investigation, 322; Working Hours Inquiry, Results, 569
Greece, Working Hours Bill in Banks, 730
Heating, Ventilating and Domestic Engineering Employers, National Association, 379
Heating and Ventilating Engineers, Demarcation Difference Settlement, 666
Hill, Mr., on the Boilermakers' Piecework Earnings, 569; on the Company formed for Buying-in Redundant Shipbuilding Yards, 441; on Unemployment among Boilermakers and on New Lines of Work, 11; on Unemployment Abatement by Scrapping Old Ships, 824
Holiday, Week-End, Advantages of, 42
Holidays, West Midland Joint Industrial Council's Recommendation, 666
Holidays with Pay, "International Labour Review" Comments, 356
Holidays with Pay, Swedish Social Board Report, 441
Holland, Metal Workers, Working Hours Statistics, January-June, 1929, 441; Painters' Unions, Holiday Fund, 322
Hours of Work, Manufacturers' Objections to Draft Bill, 646
Hours of Work for Salaried Employees, Report on Convention, 488, 794
Hungary, Federation of Trade Unions, on Rationalisation, 614
Independent Labour Party Conference, Unemployment Legislation Proposals, 356
India, Employers' Federation, All-India, Proposed, 712
Industrial Notes. See *Labour Notes* (below)
Industrial Recovery, Mr. Appleton on the Need for a Common Understanding, 179
Industrial Situation, 118, 294, 420, 537, 712, 794, 824
Industry, Problems of, and United States Personal Research Foundation, 179
International Federation of Trade Unions, Membership, 11
"International Labour Review" on Holidays with Pay, 356
Iron and Steel Industry, Improved Conditions for Workers, 178
Iron Trade Employers' Insurance Co., Report, 666
Iron Trade Wages, 139, 445, 703
Italy, Hours of Work Bill, 322; Legislation Limiting Pledging, &c., of Salaries, 118; Ratification of Washington Convention, 322
Japan, Factory-Owners and Delegation of Management to Workers, 763; Law Regulating Discharge of Workers, 763
Labour Ministry Reports, 11 42, 78, 118 (2), 135 179 197, 251, 294, 322, 356, 388, 420 (2), 441, 488, 537, 569, 614, 646, 666 (2), 712 (2), 730, 763, 794, 824 (2)
Labour Notes, 11, 42, 76, 118, 135, 178, 197, 251, 294, 322, 356, 388, 420, 441, 488, 518, 537, 569, 614, 646, 666, 712, 730, 763, 794, 824
Legge, Sir T., Appointment by T.U.C. as Medical Adviser, 251
Legislation, Industrial, Suggested Overhaul, 388
Loveday, A., on Causes of Economic Instability, 294
Luxemburg, Employment of Foreign Wage Earners, Authorisation Conditions, 135
Machinery *versus* Hand Labour in Wealth Production, 179
Macmillan, Lord, Retirement from Conciliation Organisation, 488
"Man and Metal" on Economic Advisory Council's Powers, 322; on Overtime, 646; on Rationalisation and Workers' Conditions, 763; on Reasons for Increased Unemployment, 488
Metal Workers, International, Membership, 322
Miners' Federation and "Spread-Over" of Working Hours, 763
Miners, Holiday with Extra Pay Movement, 794

Trade Societies, &c.—*continued.*

Miners' Hours, International Labour Conference Agenda, 197, 251, 666
Miners, International Technical Conference on Conditions of Work, Agreed Points, 135
Mining, Conference on Underground Hours, 441
Municipal and General Workers, Financial and other Data, 712
Netherlands, Metal Workers, Working Hours Statistics, January-June, 1929, 441; Painters' Unions, Holiday Fund, 322
Overtime, "Man and Metal" Comments, 646
Patternmaker, Metal, Enquiry, 251
Patternmakers, Annual Report, 666; Engineering Joint Trade Wages Movement, 518, 666, 794; Rationalisation, 794; Unemployment and Membership Data, 77, 251, 388, 518, 666, 794
Pensions, Old Age, United States Legislation, 11
Pension Scheme, Lancashire Electric Power Co., 487
Pichon, A., on Economic Difficulties and Social Legislation in France, 518
Poland, Unemployment Insurance Acts Amendments, 730
Post Office, Engineering Department, Workers' Wages Revision, 135
Post Office, Supervising Officers' Hours, Award, 11
Production and Organisation, Need for World Basis, 178
Professional Workers and the 48-Hour Week, 666
Professional Workers, National Federation of, 178, 197
Railway Clerks' Association and Transfer of Work to Trading Companies, 712
Railway Shopmen, Boiler Makers' Section, and the 2½ per cent., 712; Short-Time Order, 569
Railway Workers and the Bill to Ratify Washington Hours Convention, 356
Railwaymen, Heads of Eight-Hours Bill, 420
Railwaymen, National Union, Annual Report, 712; Communists in, 322
Raleigh Cycle Company's Agreement with Employees, 712
Ratification by Italy of Washington Hours, 322
Rationalisation, Mr. Appleton's Views, 763; Building Trades' Demands, 824; Hungarian Federation of Unions on, 614; Patternmakers' Resolution, 794; Scotch Steel Trade, 139; Skilled and Unskilled Workers, 135; Mr. Tillett's Views on, 42
Roumania, Unemployment Preventive Measures, 730
Ruskin College, Scholarships for Women, 488
Russia, Inspection Brigades to Urge Co-operative Trade, &c., 388; Labour Commissariat on "Real" Wage Improvement, 356; Red International Instructions on the Organisation of Strikes, &c., 322; Seven-Hour Day, Favourable Results of, 712; Soviet Conditions as to State, &c., Employment, 251; Union Membership, Exclusion of Certain Classes, 251; Union Responsibility, Soviet Decree, 441
Scottish T.U.C. and the Promotion of Collective Agreements, 537
Sherwood, W., on Solution of Unemployment Problem, 646
Shipbuilding and Engineering Trades, Platers' Helpers and Rivet-Heaters' Wages Question, 569; Proposed Termination of Agreement, 294
Shipbuilding, Mr. Hill on the Company formed for Buying Redundant Yards, 441
Shipbuilding Industry, Depressing Employment Outlook, 614; Rationalisation in, 646
Shipwrights, Association, Return to Shipbuilding and Engineering Federation, 322
Skilled Employment and Apprenticeship Association, 829
Social Charges, Burden of, in Austria, 179
South Africa and Convict Labour for Agriculture, 197
South Wales Iron and Steel Industry, Rationalisation, 47
Strike Statistics, 118, 294, 420, 537, 712, 824
Sweden, Working Hours, Proposed Permanent Legislation, 730
Swedish Industries, Report on Holidays with Pay, 441
Switzerland, Holidays with Pay Bill, Bâle Ville, 730; Loan System for Elderly Employees, 11
Tailors, Union, New National Agreement, 730
Tallinn Conference of Industrial, Organisations, Resolution, 179
Taxation, Burden on Industry, French Metal, Industries Report, 518
Taxation of Industry, R. Watson's Views, 537
Taxation and Prices, Inter-Relation, 488
Telegraphists, Wireless and Cable, Wages and Conditions Question, 77
Thomas, J. H., New Year Message to Railwaymen, 42
Tillett, B., on the Inevitability of Rationalisation, 42
Trade Disputes and Trade Unions Bill, Comments of Trade Union Congress, 794, 824
Trade Union Congress on the Five-Day Week for Government Employees, 77; G.C. and Co-Operation with Labour M.P.s., 294; G.C. and the Long Week-End Rest, 42; Medical Adviser, 251; Re-Affiliation of

Trade Societies, &c.—*continued.*

Seamen's Union, 322; Suggested Overhaul of Industrial Legislation, 388; Trade Disputes and Trade Unions Bill, 794, 824
Trade Unions, International Federation, Membership, 11, 794
Trade Unions, International, Social Legislation Programme, 537
Transport and General Workers, Benefit Data, 294
Unemployment Benefit, 1929 Figures, 356; Labour Ministry Report, 666
Unemployment Grants Committee, Schemes 42, 118, 179, 322, 388, 712, 730, 824
Unemployment, Increased, Views of "Man and Metal," 488
Unemployment Insurance, Working of New Arrangements, 763
Unemployment and the Labour Government, Patternmaker's Criticism, 78
Unemployment Reports, 11, 42, 78, 118 (2), 135, 179, 197, 251, 294, 322, 356, 388, 420 (2), 441, 488, 537, 569, 614, 646, 666 (2), 712 (2), 730, 763, 794, 824 (2)
Unemployment, Scheme for Abating by Scrapping Old Ships, 824
Unemployment, World Aspects of, Conference, 197
United States, Accidents, Causes and Frequency Rate, 11; Arbitration, Value of, and Statistics, 614; Clothing Workers' Chicago Fellowship, 42; Effect of Full Saturday Holiday, 42; Employees' Stock-Ownership Plans, Weaknesses, 197; Employers and Workers, Improving Relations, 251; Employment Stabilisation, Proposed Creation of Committees and Data of Functions, 42; History of Wages, Bulletin of Labour Bureau, 420; Iron and Steel Industry, Hours and Earnings, 356, 518; Labourers, &c., 44-Hour Week Act, 666; Lath-Workers, St. Louis, Step to Reduce Unemployment, 824; Machinists, Classification Clause in Agreement, 441; Metallurgical Industry, Accident Data, 763; Modern Machinery and Old Age, Industrial Report, 388; Old Age Pension Movement, Proposed Legislation, 11; Personal Research Foundation and Industrial Problems, 179; Plumbers' Five-Day Week Agreement, 420; Public Works Board, Proposed, 356; Rubber Company and Long-Time Employee Dismissals, 441; Smilеage Gasoline Stations, Employment of Sexagenarians, 251; Unemployment in, 77, 78, 135, 294, 388; Unemployment, Mr. Green on Causes and Remedy, 488; Unemployment Prevention Committee's Report, 666; Western Electric Co., Output Variation Research, 178; Dr. Wolman on Industrial Balance and Scientific Management, 294; Workers and Employment, Age Difficulty, 251; Working Hours of Women, Interstate Variations, 488
Wages, Fluctuations in, 118, 294, 420, 537, 712, 824
Wages, United States, History of, 420
Washington Hours and British Ratification, Belgian Inquiry, 197; Proposed Bill to give Effect to Convention, 356, 537
Watson, R., on the Relation between Unemployment and Selling Difficulties in Industry, 537
Wealth and Money, Distinction between, 488
Weaver's Wage-Deduction Case, Legal Decision, 730
West Midlands Joint Industrial Council and the Holiday Scale, 666
Women Workers, T.U.C. Conference on Organisation, 488
Woodworkers, Amalgamated Society, Benefit Figures, 712
Woodworkers, International, Expulsion of Non-Conforming Organisations, 322
Wool Textile Industry, Wage-Reduction Dispute, 441, 666, 730
Workers, Manual and Non-Manual, Mr. Citrine on Association of, 11
Workmen's Compensation, 1928, Home Office Report, 197
York Memorandum and the A.E.U. National Committee, 646

Trade :

See *Coal; Iron and Steel; Ships and Shipbuilding; Electricity;* and *Industries*

Turbines :

See *Engines and Boilers*

Universities :

See *Education*

Vehicles :

See *Motor Cars; Railways*

Warships :

See *Naval*

Water Works :

Australia, Sydney Elevated Water Reservoir, 137
Hetch-Hetchy Water Supply Scheme, *Addendum*, 252
Tubes, Artesian Well (Catalogue), 270
Water-Level Instruments (Catalogue), 270
Well Boring (Catalogue), 332

LETTERS TO THE EDITOR.

(Illustrated Subjects are Marked with an Asterisk after the Number of the Page.

AERO Engines. See *Engines, Petrol*
Airship "Graf Zeppelin," Propeller-Shaft Failures. J. Bibby, for the Wellman Bibby Co., Ltd., 43
Alloys, Anti-Friction, for Bearings. See *Bearings*
Alloys, Die-Casting, Zinc-Base. G. H. C. Gundry, for Morris Ashby, Ltd., 517
Anglo-Argentine Trade. "Engineer-Salesman," 517
Anti-Friction Metals for Bearings. See *Bearings*
Argentine, British Trade with. "Engineer-Salesman," 517
Assouan Dam, Discharge from Sluices. J. H. Jones, 23

BEAMS, Stress Distribution in. A. C. Vivian, 632*, 710*
Bearing, Journal, Practice. See *Lubrication*
Bearings, White-Metal Linings for. J. Goodman, 378
Bessemer Steel, The Case for. R. A. Skelton, for R. A. Skelton & Co., Steel & Engineering, Ltd., 517
Boiler Drums, Strength of Dished Ends. A. B. Kinzel and C. W. Obert, 517
Boilers, Lancashire and Water-Tube, for Peak Loads. G. E. Hider, 487, 571; T. B. Morley, 517
Boiler Tubes, Thickness of. F. A. Ruddock, 632*, 776; N. Artsay, 679; J. G. Docherty, 679, 711
Boiler, "Wood" Steam Generator, Temperature of Gases Leaving. C. H. Davy, for Babcock & Wilcox, Ltd., 263
Bridge, Forth, Provision for Road Traffic. A. Oates, 234
Büchi Supercharger, Trials of Marine Diesel Engine with. See *Engine*
Budget, Canadian, and Empire Trade. C. H. Luke, 632. See *Erratum*, 683

CANADIAN Budget and Empire Trade, C. H. Luke, 632. See *Erratum*, 683
Clay, Fluidity of. F. Esling, 134*
Cochin, India, Harbour Development at. R. C. Bristow, 679
Compounding of Aero Engines. See *Engines, Petrol*
Compressors, Turbo-, Efficiency of. F. Rieder, for the Société Rateau, 178
Corrosion of Metals. U. R. Evans, 134
Corrosion Tests, Accelerated. W. H. J. Vernon, 454
Creaking in Passenger Ships, J. H. Narbeth, 572

DAM, Assouan, Discharge from Sluices. See *Assouan Dam*
Dam, Eildon, Failure of. See *Clay, Fluidity of*
Daylight Illumination, Expression of Values. C. C. Paterson, 550
Dichlorofluoromethane as a Refrigerant. A. Henning, for Hedley & Co. (Leytonstone), Ltd., 776
Die-Casting Alloys, Zinc-Base. G. H. C. Gundry, for Morris Ashby, Ltd., 517
Diesel Engine. See *Engine*
Dished-End Boiler Drums, Strength of. See *Boiler Drums*
Drainage Work, Gas-Displacement Pumps for. S. P. Christie, 743
Drums, Boiler, Dished-End. See *Boiler Drums*
Dynamometer, Transmission, Simple Form. C. H. Clarke, 743; E. Giffen and C. M. White, 776

EFFICIENCY of Turbo-Compressors. F. Reider, for the Société Rateau, 178
Egyptian Irrigation, Discharge from Sluices, Assouan Dam. See *Assouan Dam*
Eildon Dam. Failure of. See *Clay, Fluidity of*
Elastic Limit in Structural Design. See *Stress Distribution in Beams*
Electric Power Stations, Boilers for Peak Loads. See *Boilers*
Empire Trade and Canadian Budget. C. H. Luke, 632. See *Erratum*, 683
Encyclopædia Britannica, Authorship of Article on Tides. J. Proudman, 234; W. H. Franks, for the Encyclopædia Britannica Co., Ltd., 263
Engine, Oil, Diesel, Marine, with Büchi Supercharger, Trials. S. W. Lister and B. G. Markham, 323; C. J. Hawkes, 418
Engines, Petrol, Aeroplane, Supercharging and Compounding. A. E. L. Chorlton, 776; G. W. Watson, 838
Engines, Petrol, Motor Car, Influence of Taxation on Design. A. Coppens, 776; H. S. Rowell, 808
Experimental Tank, Froude, Research Fund for. Lord Wester Wemyss and Sir E. H. T. d'Eyncourt, 323

FORTH Bridge, Provision for Road Traffic. A. Oates, 234
Froude Experimental Tank, Research Fund for. Lord Wester Wemyss and Sir E. H. T. d'Eyncourt, 323

GAS-Displacement Pumps for Drainage Work S. P. Christie, 743
"Graf Zeppelin" Airship, Propeller-Shaft Failures. J. Bibby, for the Wellman Bibby Co., Ltd., 43

HARBOUR Development at Cochin, India. R. C. Bristow, 679
Hydraulic Press with Flexible Platen. C. H. Clarke, 679
Hydraulics, Discharge from Sluices of Assouan Dam. See *Assouan Dam*

ILLUMINATION, Daylight, Expression of Values. C. C. Paterson, 550
India, Harbour Development at Cochin. R. C. Bristow, 679
Iron, Corrosion of. See *Corrosion of Metals*
Irrigation, Egyptian, Discharge from Sluices, Assouan Dam. See *Assouan Dam*

JOURNAL Bearing Practice. See *Lubrication*

LABORATORY, National Physical, Froude Experimental Tank, Research Fund for. Lord Wester Wemyss and Sir E. H. T. d'Eyncourt, 323
Lancashire Boilers. See *Boilers*
Legal, Reservoirs (Safety Provisions) Bill, P. Griffiths, 516
Lighting. See *Illumination*
Lubrication, Journal Bearing Practice. H. Brille, 22*; J. H. Gibson, 23*

MARINE Diesel Engine. See *Engine*
Metals, Anti-Friction, for Bearings. See *Bearings*
Metals, Corrosion of. See *Corrosion*
Metallurgy, Bessemer Steel, The Case for. R. A. Skelton, for R. A. Skelton & Co., Steel and Engineering, Ltd., 517
Metallurgy, Zinc-Base Die-Casting Alloys. G. H. C. Gundry, for Morris Ashby, Ltd., 517
Motor Taxation, Influence on Petrol-Engine Design. See *Engines, Petrol*

NATIONAL Physical Laboratory, Froude Experimental Tank, Research Fund for. Lord Wester Wemyss and Sir E. H. T. d'Eyncourt, 323
Naval Architecture, Creaking in Passenger Ships, J. H. Narbeth, 572
Naval Architecture, Design of Submarines. Prof. O. Flamm, 776; C. Preysler, 838
Nile, River, Discharge from Sluices, Assouan Dam. See *Assouan Dam*

OIL Engine. See *Engine*

PASSENGER Ships, Creaking in. J. H. Narbeth, 572
Peak Load, Boilers for. See *Boilers*
Petrol Engines. See *Engines*
Power Stations, Electric, Boilers for Peak Loads. See *Boilers*
Press, Hydraulic, with Flexible Platen. C. H. Clarke, 679
Propeller-Shaft Failures, Airship "Graf Zeppelin." J. Bibby, for the Wellman Bibby Co., Ltd., 43
Pumps, Gas-Displacement, for Drainage Work. S. P. Christie, 743

RATEAU, Prof. A., the Late, Work of. See *Turbo-Compressors, Efficiency of*
Refrigeration, Use of Dichlorofluoromethane in. A. Henning, for Hedley & Co. (Leytonstone), Ltd., 776
Reservoirs (Safety Provisions) Bill. P. Griffiths, 516
River Nile, Discharge from Sluices, Assouan Dam. See *Assouan Dam*

SHAFT, Propeller, Failures, Airship "Graf Zeppelin." J. Bibby, for the Wellman Bibby Co., Ltd., 43
Ships, Passenger, Creaking in. J. H. Narbeth, 572
Shipbuilding, Creaking in Passenger Ships. J. H. Narbeth, 572
Sluices, Assouan Dam, Discharge from. See *Assouan Dam*
Steam Generator, "Wood," Temperature of Gases Leaving. C. H. Davy, for Babcock & Wilcox, Ltd., 263
Steamers, Passenger, Creaking in. J. H. Narbeth, 572
Steel, Bessemer, The Case for. R. A. Skelton, for R. A. Skelton & Co., Steel and Engineering, Ltd., 517
Steel, Corrosion of. See *Corrosion of Metals*
Stress Distribution in Beams. A. C. Vivian, 632,* 710*
Structural Design, Elastic Limit in. See *Stress Distribution in Beams*
Submarines, Design of. Prof. O. Flamm, 776; C. Preysler, 838
Sugarloaf Dam, Failure of. See *Clay, Fluidity of*
Supercharger, Büchi. Trials of Marine Diesel Engine with. See *Engine*
Supercharging of Aero Engines. See *Engines, Petrol*

TANK, Froude Experimental, Research Fund for. Lord Wester Wemyss and Sir E. H. T. d'Eyncourt, 323
Taxation, Motor, Influence on Engine Design. See *Engines, Petrol*
Tests, Corrosion. See *Corrosion*
Thickness of Boiler Tubes. See *Boiler Tubes*
Tides, Authorship of Article in Encyclopædia Britannica on. J. Proudman, 234; W. H. Franks, for the Encyclopædia Britannica Co., Ltd., 263
Trade, Anglo-Argentine. "Engineer-Salesman," 517
Trade, Empire, and Canadian Budget. C. H. Luke, 632. See *Erratum*, 683
Transmission Dynamometer, Simple Form. C. H. Clarke, 743; E. Giffen and C. M. White, 776
Trials of Marine Diesel Engine with Büchi Supercharger. See *Engine*
Tubes, Boiler, Thickness of. See *Boiler Tubes*
Turbo-Compressors, Efficiency of. F. Reider, for the Société Rateau, 178

WARSHIPS, Submarines, Design of. Prof. O. Flamm, 776; C. Preysler, 838
Water Supply, Reservoirs (Safety Provisions) Bill). P. Griffiths, 516
Water-Tube Boilers. See *Boilers*
White-Metal Linings for Bearings. See *Bearings*
"Wood" Steam Generator, Temperature of Gases Leaving. C. H. Davy, for Babcock & Wilcox, Ltd., 263

ZEPPELIN Airship, Propeller-Shaft Failures. J. Bibby, for the Wellman Bibby Co., Ltd., 43
Zinc-Base Die-Casting Alloys, G. H. C. Gundry, for Morris Ashby, Ltd., 517
Zinc, Corrosion of. See *Corrosion of Metals*

PATENT RECORD.

The Patent Index is classified under the following sub-titles:—ELECTRICAL APPARATUS; GAS ENGINES, PRODUCERS, HOLDERS, &c.; LIFTING AND HAULING APPLIANCES; MACHINE AND OTHER TOOLS, SHAFTING, &c.; MINING, METALLURGY AND METAL WORKING; MISCELLANEOUS; MOTOR ROAD VEHICLES; PUMPS; RAILWAYS AND TRAMWAYS; SHIPS AND NAUTICAL APPLIANCES; AND STEAM ENGINES, BOILERS, EVAPORATORS, &c.

SUBJECT MATTER.

Electrical Apparatus:

Motors, Reciprocating, Electric. R. C. Graseby, 430

Gas Engines, Producers, Holders, &c.:

Carbonising Apparatus. International-Combustion, Ltd., and S. McEwen, 240
Carburettors, Spray. W. A. Whatmough and H. Weslake, 64
Internal-Combustion Engines. A. H. R. Fedden, L. F. G. Butler, and the Bristol Aeroplane Co., Ltd., 464
Internal-Combustion Engines. R. A. Lister & Co., and A. F. Sanders, 464
Internal-Combustion Engines. Morris Commercial Cars, Ltd., and W. W. Hamill, 430
Piston Rings. William Doxford & Sons, Ltd., and K. O. Keller, 558
Producer, Gas, Feeding Mechanism. Wellman-Seaver-Morgan Co., 64
Retorts, Vertical. E. West and West's Gas Improvement Co., Ltd., 302
Water-Gas Plant. Tully, Sons & Co., Ltd., and A. V. Tully, 64

Lifting and Hauling Appliances:

Cranes, Jib, Luffing. Thomas Smith & Sons (Rodley), Ltd., and C. Walls, 240
Hoists, James and Fredk. Howard, Ltd., and W. H. Ashby, 430
Jacks, Pressure. H. C. Miller and E. H. Dainton, 240

Machine and Other Tools, Shafting, &c.:

Bearings, Roller. W. H. Jones and T. Rowbotham & Co., Ltd., 302
Clutch Driving Mechanism, Toothed. Mavor & Coulson, Ltd., and J. B. Mavor, 240
Clutches. C. G. Nevatt and E. G. Kingston, 558

Mining, Metallurgy and Metal Working:

Drills, Rock. J. L. and A. T. Holman, 464
Furnaces. H. S. Knowles and W. Burkinshaw, 302
Linings, Furnace. S. Travis and the Callow Rock Lime Co., Ltd., 64
Tubes, Metal, Manufacture. Wellman Seaver Rolling Mill Co., Ltd., and S. Smith, 464
Welding Plant. Burdons, Ltd., and W. H. Howden, 64

Miscellaneous:

Air-Heating and Supply Systems. R. K. Webster, 430
Coin-Operated Mechanism. R. C. Graseby, 558
Flame Combustion, Preventing Propagation of. T. R. Cave-Brown-Cave and H. Wood, 302
Gearing, Differential. R. C. Graseby, 558
Glands, Packed. J. L. and A. T. Holman and J. Arthur, 430
Glass Melting. John Moncrieff, Ltd., and A. F. McNish, 430
Glass, Molten. T. F. Pearson, 526
Liquid, Tank-Stored, Separating Impurities from. Liquid Measurements, Ltd., and F. Hammond, 302

Miscellaneous—*continued.*

Metallic Jointing. The Gas Light and Coke Co., and F. Spencer, 464
Sand Blast Apparatus. J. W. Jackman & Co., Ltd., and F. W. Neville, 526

Motor Road Vehicles:

Brake Mechanism, Front Wheel. F. W. Scott and Clayton Wagons, Ltd., 240
Wheel Hubs. British Timken, Ltd., and P. C. Austin, 464

Pumps:

Pumps, Rotary. T. W. Nichols, 464

Railways and Tramways:

Chairs and Sleepers, Metal. Ebbw Vale Steel, Iron & Coal Co., Ltd., and G. Barrett, 526
Gear, Central Buffer and Draw. C. W. C. Hine, and George Spencer, Moulton & Co., Ltd., 526

Ships and Nautical Appliances:

Propelling Machinery. W. Hinchcliffe and J. Scott, 302
Stern Tubes, Ships'. L., P. & R. Ferguson, 526

Steam Engines, Boilers, Evaporators, &c.:

Condensing Plant, Steam. Contraflo Engineering Co., Ltd., and H. Hillier, 558
Ejectors, Multi-Stage Steam-Jet. G. & J. Weir, Ltd., and J. Sim, 526
Generators, Steam. Stirling Boiler Co., Ltd., and H. S. Horsman, 526
Packings, Metallic. United Kingdom Self-Adjusting Anti-Friction Metallic Packing Syndicate, Ltd., and F. F. Brookes, 526
Stokers, Chain Grate. Babcock & Wilcox, Ltd., and A. E. Parker, 64
Superheaters. H. E. Yarrow, 240
Water-Cooling Towers. M. E. Gerard and L. G. Mouchel & Partners, Ltd., 430

NAMES OF PATENTEES.

Arthur, J., and others. Packed Glands, 430
Ashby, W. H., and others. Hoists, 430
Austin, P. C., and others. Wheel Hubs, 464

Babcock & Wilcox, Ltd., and another. Chain Grate Stokers, 64
Barrett, G., and others. Metal Chairs and Sleepers, 526
Bristol Aeroplane Co., Ltd., and others. Internal-Combustion Engines, 464
British Timken, Ltd., and another. Wheel Hubs, 464
Brookes, F. F., and others. Metallic Packings, 526
Burdons, Ltd., and another. Welding Plant, 64
Burkinshaw, W., and another. Furnaces, 302
Butler, L. F. G., and others. Internal-Combustion Engines, 464

Callow Rock Lime Co., Ltd., and another. Furnace Linings, 64
Cave-Brown-Cave, T. R., and another. Preventing Propagation of Flame Combustion, 302
Clayton Wagons, Ltd., and another. Front Wheel Brake Mechanism, 240
Contraflo Engineering Co., Ltd., and another. Steam Condensing Plant, 558

Dainton, E. H., and another. Pressure Jacks, 240
Doxford, William, & Sons, Ltd., and another. Piston Rings, 558

Ebbw Vale Steel Iron & Coal Co., Ltd., and another. Metal Chairs and Sleepers, 526

Fedden, A. H. R., and others. Internal-Combustion Engines, 464
Ferguson, L., P., and R. Ships' Stern Tubes, 526

Gas Light & Coke Co., and another. Metallic Jointing, 464
Gerard, M. E., and others. Water-Cooling Towers, 430
Graseby, R. C. Coin-Operated Mechanism, 558
Graseby, R. C. Differential Gearing, 558
Graseby, R. C. Electric Reciprocating Motors, 430

Hamill, W. W., and others. Internal-Combustion Engines, 430
Hammond, F., and others. Separating Impurities from Liquid, 302
Hillier, H., and others. Steam-Condensing Plant, 558
Hinchcliffe, W., and another. Propelling Machinery, 302
Hine, C. W. C., and others. Central Buffer and Draw Gear, 526
Holman, J. L. and A. T. Rock Drills, 464
Holman, J. L. and A. T., and another. Packed Glands, 430
Horsman, H. S., and others. Steam Generators, 526
Howard, James & Fredk., Ltd., and another. Hoists, 430
Howden, W. H., and others. Welding Plant, 64

International Combustion, Ltd., and another. Carbonising Apparatus, 240

Jackman, J. W., & Co., Ltd., and another. Sand Blast Apparatus, 526
Jones, W. H., and others. Roller Bearings, 302

Keller, K. O., and others. Piston Rings, 558
Kingston, E. G., and another. Clutches, 558
Knowles, H. S., and another. Furnaces, 302

Liquid Measurements, Ltd., and another. Separating Impurities from Liquid, 302
Lister, R. A., & Co., Ltd., and another. Internal Combustion Engines, 464

Mavor, J. B., and others. Toothed Clutch Driving Mechanism, 240
Mavor & Coulson, Ltd., and another. Toothed Clutch Driving Mechanism, 240
McEwen, S., and others. Carbonising Apparatus, 240
McNish, A. F., and others. Glass Melting, 430
Miller, H. C., and another. Pressure Jacks, 240
Moncrieff, John, Ltd., and another. Glass Melting, 430
Morris Commercial Cars, Ltd., and another. Internal-Combustion Engines, 430
Mouchel, L. G., and Partners, Ltd., and another. Water-Cooling Towers, 430

Nevatt, C. G., and another. Clutches, 558
Neville, F. W., and others. Sand Blast Apparatus, 526
Nichols, T. W. Rotary Pumps, 464.

Parker, A. E., and others. Chain Grate Stokers, 64
Pearson, T. F. Molten Glass, 526

Rowbotham, T., & Co., Ltd., and others. Roller Bearings, 302

Sanders, A. F., and others. Internal-Combustion Engines, 464
Scott, F. W., and others. Front Wheel Brake Mechanism, 240
Scott, J., and another. Propelling machinery, 302
Sim, J., and others. Multi-Stage Steam-Jet Ejectors, 526
Smith, S., and others. Manufacture of Metal Tubes, 464
Smith, Thos., & Sons (Rodley), Ltd., and another. Luffing Jib Cranes, 240
Spencer, F., and others. Metallic Jointing, 464
Spencer, George, Moulton & Co., Ltd., and another. Central Buffer and Draw Gear, 526
Stirling Boiler Co., Ltd., and another. Steam Generators, 526

Travis, S., and others. Furnace Linings, 64
Tully, A. V., and others. Water-Gas Plant, 64
Tully, Sons & Co., Ltd., and another. Water-Gas Plant, 64

United Kingdon Self-Adjusting Anti-Friction Metallic Packing Syndicate, Ltd., and another. Metallic Packings, 526

Walls, C., and others. Luffing Jib Cranes, 240
Webster, R. K. Air-Heating and Supply Systems, 430
Weir, G. & J., Ltd., and another. Multi-Stage Steam-Jet Ejectors, 526
Wellman-Seaver-Morgan Co. Gas Producer Feeding Mechanism, 64
Wellman Seaver Rolling Mill Co., Ltd., and another. Manufacture of Metal Tubes, 464
Weslake, H., and another. Spray Carburettors, 64
West, E., and others. Vertical Retorts, 302
West's Gas Improvement Co., Ltd., and another. Vertical Retorts, 302
Whatmough, W. A., and another. Spray Carburettors, 64
Wood, H., and another. Prevention Propagation of Flame Combustion, 302

Yarrow, H. E. Superheaters, 240

LONDON :

Printed for the Proprietors by HARRISON & SONS, LTD., at the BEDFORD PRESS, 20 & 21, Bedfordbury, in the Parish of St. Martin's-in-the-Fields, and Published by CHARLES ROBERT JOHNSON, at the Offices of "ENGINEERING," 35 & 36, Bedford Street, in the Parish of St. Paul, Covent Garden, both in the County of Middlesex.—Friday, July 25, 1930.